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A
NEW PLAN
FOR
SPEEDILY INCREASING
THE
NUMBER OF BEE-HIVES,
&c. &c. &c.

A

NEW PLAN

FOR

SPEEDILY INCREASING

THE

NUMBER OF BEE-HIVES

IN

SCOTLAND;

AND WHICH MAY BE EXTENDED, WITH EQUAL SUCCESS,

TO

ENGLAND, IRELAND, AMERICA,

OR

TO ANY OTHER PART OF THE WORLD CAPABLE OF PRODUCING FLOWERS.

By JAMES BONNER, Bee-Master,

AUTHOR OF PRACTICAL WARPING MADE EASY, &c.

Though ſmall's the Inſect, great will be the Gain;
If heavenly Powers permit, and Phoebus not diſdain.

Virg.

EDINBURGH:
PRINTED BY J. MOIR, PATERSON'S COURT:
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THE PRESIDENT,

AND THE OTHER

RIGHT HONOURABLE

AND HONOURABLE MEMBERS

OF THE

HIGHLAND SOCIETY OF SCOTLAND.

MY LORDS AND GENTLEMEN,

THE generous and diſtinguiſhed mark of reſpect already beſtowed upon me, for my ſmall exertions in the ſervice of the Public, while it commanded my gratitude, at the ſame time emboldened me to ſolicit your Patronage to the following ſheets, wrote upon the important ſubject which firſt introduced me to your notice. Your ready and unanimous acquieſcence, in granting me this additional honour, with the particular favours I have received from many of you, adds exceedingly to the obligations formerly beſtowed, and calls for freſh ebullitions of my utmoſt gratitude to you, both as a Society and as Individuals.

THAT your laudable endeavours, for promoting the good of your Country, in every reſpect, may be crowned with the greateſt ſucceſs, and that both the preſent and future generations may be extenſively benefited by your public-ſpirited and patriotic exertions, is the earneſt wiſh of,

MY LORDS AND GENTLEMEN,

Your moſt obedient,
Moſt obliged, and
Moſt humble Servant,

JAMES BONNER.

EDINBURGH,
JULY 18. 1795.

PREFACE.

BIOGRAPHERS and PHILOSOPHERS are equally puzzled to account for the great diverſity of talents among mankind, and the peculiar bent of genius to be found in each individual. While ſome pretend to account for theſe peculiarities, from the accidental circumſtances in which individuals happen to be placed, others, with at leaſt equal probability, attribute them to peculiar inclinations, implanted by Nature, or rather the Author of Nature in the human mind. Perhaps both cauſes muſt co-operate to produce that degree of enthuſiaſtic fondneſs for particular purſuits, which, in all ages, has diſtinguiſhed ſome individuals in every branch of ſcience, or of art, and which is ſo humorouſly entitled by the facetious STERNE, a man's HOBBY HORSE. *

The author of this work has been, almoſt from his infancy, an admirer of bees, and the

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* Triſtram Shandy, vol. 1.

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But, however valuable and uſeful many of the treatiſes already publiſhed on this ſubject have been, he is confident, from the repeated obſervations and experiments he has made, that moſt of them are not only defective, but even erroneous in many particulars; and that the culture of bees in Britain ‡, has never yet arrived at any thing near that degree of perfection, to which it might be brought, if the ſyſtem which he has formed, and now ſubmits to the public, were generally underſtood and properly practiſed. If we only conſider the almoſt infinite number of mellifluous flowers, which perfume the air in the honey ſeaſon; and, in particular, the white clover, which ſo generally and profitably now overſpreads ſo large a part of our lands in graſs; the various

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his chief pleaſure, as well as buſineſs, to ſtudy every poſſible improvement reſpecting that wonderful race. During the honey ſeaſon, he has often been ſo intent upon this ſtudy, that he hardly allowed himſelf ſleep for whole weeks together.

‡ Although the author, in making out his calculations relative to the increaſe of Bee hives, was under the neceſſity of confining himſelf to ſome one particular country, and naturally made choice of his native land, his plan will, nevertheleſs, he is confident, apply with equal propriety to ENGLAND, IRELAND, AMERICA, or indeed any other part of the known world, capable of producing proper food for theſe inſects.

rious ſpecies of muſtard, and plants of a ſimilar kind, found ſtill in our corn fields, together with the vaſt abundance of heath, that grows ſpontaneouſly on our extenſive moors and hills, we may juſtly ſay, how large and numerous, are our paſture grounds, but how very few are our flocks to feed on them!

A judicious author juſtly obſerves, that the culture of bees is a branch of rural œconomy, the more valuable, that it is within the reach of the pooreſt cottager, and requires neither plowing, manure, cattle, nor rich meadows. All that is wanted, is a ſmall degree of attendance, which may be given by the meaneſt, as it is requiſite only for a ſhort time; and therefore the plentiful harveſt of honey and wax that is produced, may be conſidered as ſo many RICH CROPS REAPED WITHOUT SOWING.

As nothing is ſo hurtful to bees as bad weather, ſo nothing can be ſo little counteracted; although even the bad effects of it may, in ſome meaſure, be prevented; for, we can preſerve our bees in cold and ſnowy winters, by confining them; and, in a late ſpring, or rainy ſummer, we can preſerve them from famine, by feeding them properly. But, even in the moſt unfavourable weather, I never deſpond; for

nued proſecution of this his favourite ſtudy, he has made a number of very important diſcoveries relative to theſe uſeful inſects, he thought it better to preſent theſe new ideas, along with the ſubſtance of his former work, compreſſed into as ſmall bounds as poſſible, in a new form, and under a new title, than merely to reprint the old work with additions. And the chief object of the preſent performance being to excite the attention of the public in general, but eſpecially of gentlemen in opulent circumſtances, to the rearing of bees, by ſhowing them the PRACTICABILITY of increaſing the number of bee-hives in this country at leaſt TWENTY-FOLD, if not to FIFTY times the number there are at preſent, he thought it proper to entitle the whole maſs of old and new matter, " A New Plan for ſpeedi- " ly increaſing the number of Bee-Hives in " Scotland, &c."

Nor is it to his literary labours alone, that he has been indebted for the liberal encouragement he has met with. In his *commercial* concerns, as a dealer in honey, he has been honoured with the patronage and employment of a number of the nobility and gentry in Edinburgh, Newcaſtle, and many other places;

for which he embraces this opportunity of returning them his beſt thanks. And here he cannot help mentioning a circumſtance which he eſteems peculiarly fortunate, as it introduced him to the employment and patronage of that reſpectable patriot, the PRESIDENT OF THE BOARD OF AGRICULTURE; whoſe exerons for the improvement of his country, and general benefit of ſociety, far exceed his praiſe. One morning in autumn laſt (1794) as the author was carrying a few very fine honey combs, to a gentleman in the New Town, he was met by Sir John Sinclair, whom previouſly he did not know, * and was deſired to bring to him ſome of his fine honey next morning. This he accordingly did, and a converſation having enſued, reſpecting the time he had ſpent in the culture of bees, the number of hives he kept, &c. &c. he was deſired by the public-ſpirited Baronet to draw up a plan for the rearing of bees in a more extenſive manner: and the author having executed this taſk to the beſt of his

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* About a year before this, ſeveral gentlemen had deſired the author to wait upon Sir JOHN SINCLAIR, and lay before him a plan for the rearing of bees; but diffidence always prevented him, and probably ever would, if Providence had not brought about the interview in ſome ſuch manner as the above-mentioned.

his abilities, Sir John Sinclair was kind enough to lay it before the Highland Society, who were ſo good as to honour him with one of their higheſt premiums, for his unremitting and ſucceſsful attention, during a period of no leſs than 26 years, in acquiring a knowledge of the operations of bees; and for the various diſcoveries made by him, tending to multiply the number of hives, and quantity of honey and wax in this kingdom, contained in his communications to the ſociety, and now laid before the public, in this treatiſe.

This encouragement led the author to hope, that his plan might turn out to be generally adopted, if once univerſally known. He therefore diſtributed ſubſcription papers, in order to try the minds of the public in general; and in doing this, his ſucceſs far exceeded his moſt ſanguine expectations; for he ſcarcely met with one in an hundred, who did not approve of his plan; as will appear from the reſpectable liſt of ſubſcriptions prefixed to this work, and which might have been rendered greatly more numerous, if the author's time and other avocations had permitted him to circulate his propoſals more generally.

The author, therefore, without farther apology, now ſubmits his plan to the attention of the public; and he has not a doubt, but that, if the directions therein given are ſtrictly adhered to, and perſevered in by gentlemen of property, and the public in general, in a few years Scotland will not only ſave much money now ſent abroad for honey and wax, but will even be able to render them articles of export.

He needs only add, that, in the following treatiſe, he has not, as too many authors in all branches of ſcience are apt to do, ſtrained any arguments to ſupport a favourite hypotheſis: But, on the contrary, his whole theory and practice being founded on experience and facts, he flatters himſelf, that he has delivered his ſentiments throughout the work, in a manner ſo plain and intelligible, that the moſt unlettered reader will not miſtake his meaning.

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Nathan Surgeon, Eſq; ſurgeon, Newcaſtle
Reverend Mr Sharp, Coldingham
Reverend Mr Shepherd, Bolam
Reverend Mr William Syme, Newcaſtle
Mr Alexander Scott, Coldingham
Meſſrs Thomas and William Sommers, vintners, Edinburgh
Mr Alexander Steel, merchant, Edinburgh
Mr Strange, teacher of dancing, Edinburgh
Mr Robert Swanſton, tenant, Newfarm

T

John Tawze, Eſq; W. S. Edinburgh
Anthony Taylor, Eſq; Infirmary, Newcaſtle
J Thompſon, M. D. Gayfield, Edinburgh
Charles Thomſon, Eſq; Edinburgh
Thomas Tod, Eſq; Edinburgh
Thomas Tod, junior, Eſq; George's Square, Edinburgh

Alexander Tweedie, Eſq; of Quarter
John Tweedie, Eſq; writer, Edinburgh
Mr Robert Tweedie, merchant, Edinburgh
Reverend Mr Robert Trotter, Morpeth
Mr John Tait, joiner, Guyzon
Mr Thomas Taylor, Newburn
Mr Robert Thomſon, merchant, Edinburgh
Mr Andrew Thompſon, Lauder
Mr Thomas Thompſon, inn-keeper, Gateſide
Mr William Thomſon, Haddington
Mr James Thorburn, grocer, Edinburgh
Mr Train, engraver, Bourdeau houſe

U

James Ure, Eſq; Comptroller of the Cuſtoms, Alloa
Reverend David Ure, A. M. Edinburgh

V

Caſpar Voght, Eſq; Hamburgh
John Veitch, Eſq; Surgeon, Ayton

W

Andrew Wardrop, Eſq; ſurgeon, Edinburgh
John Wilſon, Eſq; Morpeth
James Wood, M. D. Newcaſtle
Mrs Alexander Wood, Edinburgh
George Wood, Eſq; ſurgeon, Edinburgh
Reverend Mr Wilſon, Ayton
Mr. James Watſon, merchant, Newcaſtle
Mr Walker, North America
Mrs Wardlaw, Edinburgh
Mrs Watſon, Charlotte Square, Edin.
Mr William Watſon, upholſterer, Edinburgh
Mr John White, ſchoolmaſter, Ayton
Mr Robert Whitfield, Morpeth
Mr Joſeph Whitfield, bookſeller, Newcaſtle
Mr George Whitlaw, Ayton
Mr ——— Woodman, Morpeth

Y

Mr Ebenezer Young, bailie of Dunſe
Mr John Young, Edinburgh

A conſiderable number of ſubſcriptions, beſides thoſe above inſerted, have been obtained for this work, which the author is ſorry he cannot inſert, his correſpondents not having yet tranſmitted him their liſts.

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NEW PLAN FOR *SPEEDILY INCREASING* THE NUMBER OF BEE-HIVES IN SCOTLAND.

CHAP. I.

OF THE PLEASURE AND PROFIT, THAT ATTEND THE KEEPING OF BEES.

BEES, thoſe emblems of virtue, have long been the ſtudy and delight of wiſe men, and have employed the ableſt pens in many nations, and in different ages. In the ſacred writings, the land of Canaan is ſpoken of as a good land, and, as an evidence of its being ſo, it is called a land flowing with milk and *honey*. Among the ancients, Ariſtomachus contemplated bees for the ſpace of fifty-eight years; and Philiſcus retired into the woods, that he might have more convenient opportunities of obſerving them. Among the moderns, I ſhall juſt only mention Purchas, Rouſden, Geddie, Butler, Warder, Bradley, Thorly, Thomas and Daniel Wildman, Stephen and William White, and Keys, all Engliſhmen, and Robert Maxwell, a Scotchman;—all of whom have publiſhed treatiſes on them, the moſt of which have appeared within this century; and they have given many uſeful directions how to manage bees, according to the knowledge they had attained to, reſpecting that admirable inſect.

The knowledge of bees, like that of many other things, is found out by degrees, and may be ſaid, in ſome meaſure, to be ſtill but in a ſtate of infancy, as appears by the many miſtakes fallen into, and taught by thoſe who have wrote on that ſubject, notwithſtanding their fair promiſes in their title pages; as—" A Complete " Guide for the management of Bees," &c. They have all been ſtrangely miſled in their opinion about the generation of bees, aſſerting that the Queen lays three different kind of eggs, *viz.* one kind for the production of the Queen Bee, another for that of the Working Bees, and a third for the Drones; an opinion, which the author of the following ſheets will, he humbly hopes, prove to be erroneous.

As in every undertaking there is ſome leading motive, which excites us to engage in it, ſo the rearing of bees is attended with a degree both of profit and pleaſure, highly deſerving the attention of the philoſopher, the gentleman-farmer, and the induſtrious peaſant. What is more pleaſant, than to obſerve the labours of a hive of bees in the ſpring, when the days begin to lengthen, and froſt and ſnow, like birds of darkneſs, cannot bear the ſun! Then theſe induſtrious creatures begin to fly about, and dance and ſing, rejoicing at the return of the genial ſeaſon! Then they reform what is amiſs in the hive, and, as their family enlarges, they omit no opportunity of gathering in freſh proviſion for their increaſing young. In the honey ſeaſon, how delightful to ſee them hurrying in their yellow loads! How diligent they are to lay up proviſion for the returning winter! View them in this ſmiling clover field, or yonder flowery mead! See how buſily they work! And hear how ſweetly they ſing! How pleaſant to behold a ſwarm of bees lightly flying in the air, and darkening the heavens with a thouſand varying lines! Now, behold the innumerable tribe, formed into one compact body, ſuſpended from yonder verdant ſhrub, eſtabliſhing themſelves into an independent colony, while their careful maſter, with conſcious delight, meditates on his increaſing ſtore!

Bees, when properly managed, are alſo very profitable, as, in good years, moſt hives will throw two ſwarms; in moderate years, one. Although, in bad years, perhaps, ſome will ſwarm none at all, yet, eſtimating by moderate years, and allowing each hive, one with another, to ſwarm only once, which valuing at 15s. each, twenty ſtock hives will thereby yield their maſter 15l. yearly;—no ſmall ſum to be got with ſo much pleaſure, and ſo little toil. They will yield that much, although one or two ſhould die in winter; nor need any think my eſtimate too high; if their hives be good, they will have that much one year with another. For example, in ſummer 1787, the advantage ariſing from bees was ſuch, that many proprietors of them made 30s. and ſome even 40s. of one ſingle hive; and in March 1788, I ſold a hive to a neighbour of mine, which in the following ſummer increaſed to five, four of which he ſet aſide for ſtock hives that autumn.

As there is no concern, in rural œconomy, more profitable than bees, in favourable ſeaſons, conſidering the trifling expence that attends them, we ſhall here give an eſtimate to what extent bees may be reared, and alſo what their value may amount to in ten years.

Suppoſe, for inſtance, one ſhould begin with five hives, which will coſt him 5l., no great ſum to commence bee-maſter with, and allowing each hive, one with another, to double their number, they will increaſe in the following proportions :

Years.	Hives.
1	5
2	10
3	20
4	40
5	80
6	160
7	320
8	640
9	1280
10	2560

Thus, in the ſpace of 10 years, 5 hives will produce 2560 ſwarms, which, valued at 10s. each hive, a very moderate eſtimation, amounts to 1280l. clear profit; allowing the ſecond and third ſwarm to pay for hives, ſtools, labour, and incidental loſſes.

By the above calculation, my reader muſt not conclude, that every hive of bees will produce ſo many; but, I confidently aſſert, that many have done ſo, and much more, in proportion, according to the time they have ſtood; but, ſuppoſing 160 of theſe hives ſhould fail by cold, robbers, famine, or bad management, during the above mentioned years, there will ſtill remain 1200l. of clear profit.

Let it alſo be conſidered here, that by the above eſtimation, it is taken for granted, that the ſeaſons are very favourable for bees, being fine, calm, ſunny warm weather, with ſoft ſhowers now and then, and alſo plenty of good paſture in their neighbourhood, whereon they will work and ſing without moleſtation; wantonly ſkipping from flower to flower, and rifling all their ſweets, rejoicing that they are amply provided with ſuch plenty of proviſion, while the ſmiling ſun invites them to enjoy it. With what delight have I often witneſſed my induſtrious ſervants carrying on their work with ſo much ſimplicity, alacrity, and chearfulneſs, and ſinging ſo ſweetly; inſomuch that they are fit to make me join the concert, and ſing,

What's this I hear, makes ſuch melodious ſound!
Surely I've got on ſome enchanted ground.
'Tis Canaan's inſects that I here behold,
Whoſe legs do glitter like the yellow gold.
The furze and broom in luſtre here do ſhine,
Whoſe yellow tops regale thoſe flocks of mine.
Here ſilver ſtreams in flow'ry valleys glide,
And rows of willows deck the river's ſide:
Here lambkins play upon the ſunny braes,
And ſweeteſt nectar ſmells on clover lees.
Here are the fields with Nature's colours dight,
Grateful to ſmell, and pleaſant to the ſight.
Retired pleaſure ſoothes and calms the mind;
A noiſy world oft leaves a ſting *behind.*

On the contrary, however, ſhould the ſeaſon go to the other extreme, and, inſtead of fair weather, ſhould windy, cold, wet, cloudy, and heavy weather take place, during ſummer, the bees will by it be ſo much diſheartened and diſcouraged, that they will lament and mourn, in ſo piteous and diſconſolate a manner, that they have often made ſuch an impreſſion on my ſpirits, that I was fit to mourn along with them. The truth is, I have often thought that there was ſomething of the nature of a bee in myſelf; as always when they are happy, and rejoicing, ſo am I; when they are mourning and diſconſolate, my ſpirits are alſo low; when fighting and plundering from one another, my temper is ſo chagrined, that it is with difficulty I reſtrain the effects of my ill humour; inſomuch, that my domeſtics, with little knowledge in phyſiognomy, can eaſily judge from the chearfulneſs, depreſſion, or chagrin, apparent on my countenance, the ſtate and temper of my little republics.*

It

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* A two-fold reaſon may be aſſigned for this. Fine weather enlivens the animal ſpirits, whereas a dull ſky, and a cloudy atmoſphere, generally produce the contrary effect. In the latter caſe, the bees can do nothing but conſume a part of that delicious ſtore, which they had laid up for their own and their maſter's uſe. Sympathy and intereſt are therefore equally excited, by ſuch weather, to produce this effect; and ſtill more by the circumſtance of their killing one another; for that man muſt be callous, indeed, to every feeling of humanity, who can, with indifference, behold numbers of ſuch uſeful and induſtrious animals, lying like ſo many murdered heroes on the field of battle, mutually ſlain by each other; not to add, that a perſon of the moſt ſtoical diſpoſition muſt feel ſomewhat ruffled, at the loſs of ſo many uſeful ſervants, whom he would do every thing in his power to preſerve.

In ſuch unfavourable ſeaſons, bees increaſe ſo very little, that, perhaps, the owner can ſcarcely collect, from among all his hives, as many good ones, as will keep up his ſtock properly for the next ſeaſon; but as ſuch bad ſeaſons does not happen often, it ſhould not diſcourage any perſon from commencing bee-maſter, as even, in the very worſt, with proper care, the ſtock may always be preſerved, which is not the caſe with many other articles in which mankind deal.

It is hardly neceſſary to obſerve, that bees have amazingly thriven laſt year, as almoſt every hive produced twice, and many even thrice; and conſequently, the price of honey has thereby been greatly reduced, from what it was in former years.

CHAP. II.

OF THE APIARY.

As a general rule, place your hives where they will be leaſt expoſed to the wind, and enjoy as much of the influence of the ſun as poſſible; for wind always retards the bees in their work, while the ſun's beams invite them to it. Although it is well known, that bees will thrive well in high and windy ſituations, yet a low one is always to be preferred. In the neighbourhood of the apiary, there ſhould be abundance of flowers, from which the bees may collect their wax and honey.

Were a choice allowed me, where to place my bees, it would be in an early ſituation,—a hollow glen by the ſide of a rivulet, ſurrounded with abundance of turnips in bloſſom, in the ſpring,—muſtard and clover in ſummer,—and heath in the latter end of ſummer and harveſt; with a variety of other garden and wild flowers in their ſeaſons. However I would not be underſtood, as if I hinted that bees would not thrive, unleſs they were placed in ſuch an advantageous ſituation, as the contrary can be proved; for bees have thriven amazingly well, in places where they were not within reach of many of the above mentioned flowers; but although they will do well in moſt ſituations, and fly far for food, yet they will thrive far better, when ſituated among or near good paſture; and ſurrounded with abundance of food. This leads us forward to ſhew what is the proper paſture for bees, which ſhall be the ſubject of the following chapter.

CHAP. III.

OF THE PASTURAGE, OR FLOWERS, PROPER FOR BEES TO FEED ON, WITH A CATALOGUE OF SOME OF THE PRINCIPAL ONES.

AMONG the great variety of flowers, which wiſe Nature has ſo profuſely laid before our noble inſects, from which they may abundantly ſupply themſelves with food, we ſhall, in the firſt place, give ſome particular account of thoſe five principal ones in this country, from which bees extract vaſt quantities of honey;—viz. turnips, rape, muſtard, clover and heath; and then conclude this chapter, with ſome account of many other excellent flowers which bees feed on.

Turnips, in particular, blow early in the ſpring, and continue long in flower; and they alſo yield both honey and farina, by which the bees are greatly excited to go abroad, and work upon them, when perhaps, in late ſituations, they have ſcarcely any other flower to work upon. In ſuch places, therefore, it is highly proper, that turnips be ſowed, and allowed to remain in the ground during winter. Theſe, yielding their flowers from the middle of March to the end of April, will afford the bees ſix weeks good paſture, and thus render them equal to thoſe in more favourable or earlier ſituations; whereas they would perhaps have ſcarcely had any other flower to work upon, that could do them much good. I would therefore, ſtrongly recommend to all proprietors of bees, particularly thoſe in late ſituations, if they can by any means, to let always as many turnips run into bloſſom in the ſpring, as may be ſufficient to afford plenty of early paſture for their bees to work on. Thus the rich may ſupply themſelves with that ſeed for ſowing, and the poor will have it to ſell to thoſe who need it, which will enable them to pay the rent of the ground they grow upon. But here it may naturally be aſked, By what rule are we to judge, what quantity of ground will yield a ſufficiency of food for any given number of hives? I anſwer, that very little ground will keep many hives abundantly at work; as, for example, one acre of good land would not be overſtocked with 20 hives; and conſequently, the twentieth part of an acre would keep one in conſtant employment.

The rape in bloſſom anſwers the ſame end to bees as the turnips; and as it is a little later of flowering, it will yield the bees a freſh and ſeaſonable ſupply, when the turnips begin to fade, and thereby keep them conſtantly at work till the latter end of May,* when all the herbs of nature will, as it were, vie with each other who ſhall contribute moſt to ſupply this noble and virtuous race, with abundance of the ſweeteſt nectar. Then, at this ſeaſon, the balmy plane-tree regales them in the morning, before the drowſy herd aſcends the hill to relieve his impriſoned bleaters: and the gold-like furze, muſtard, and broom, invite them to feaſt till the day decline.

Garden and wild muſtard, with runches of all kinds, bees are very fond of, and work keenly thereon; and theſe flowers are attended with this advantage, that by ſowing their ſeeds at different times in the Spring, their flowering may be ſo protracted, as to afford the bees a ſufficiency of paſture during the whole working ſeaſon.

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* The two flowers above mentioned, as they are eaſily raiſed, ſhould be paid particular attention to, in the Highlands of Scotland, or any other Moorland ſituations, where there are very few natural flowers growing, except the heath.

In June comes the white clover, which continues long in bloſſom, and alſo yields abundance of the fineſt of honey: And wherever the proprietor of bees has it in his power, he ſhould be particularly attentive to raiſe it in his paſture lands; and, as I hinted with reſpect to turnips and rape, the clover graſs will pay the rent of the ground, excluſive of what advantage the bees derive from it. So fond are the bees of this flower, that whenever it appears, they will deſert and overlook many other excellent flowers, as unworthy of their attention, and eagerly dart upon it, and work and ſing thereon all the day long, until the cold evening chaſe them with reluctance home to reſt: But, as all nature's beauties fade, and thereby give way to their ſucceſſors, ſo does this beloved herb, as, about the end of July, they begin to blacken, and the balmy dew to forſake their ſweeteſt lips; then our heroes go in ſearch of freſh proviſions, and in their rambles, as they ſkim over our lofty mountains, are attracted by the blue heather bells, which are numberleſs as the ſands on the ſea ſhore;

each one of which, by the aſſiſtance of Phœbus, diſcloſes its ſweets, and thereby invites the tranſported bee to rifle all their charms.

Heath is attended with this advantage, that it needs no culture nor rearing; but, on the contrary, grows ſpontaneouſly, in too great abundance, in many places; as, moſt certainly, the greater half of Britain is covered with it; but, like the clover, it yields alſo vaſt quantities of the fineſt honey; and, when the month of Auguſt is favourable warm weather, no thriving hives of bees, placed near it, need fail, in a ſhort time, to enrich themſelves with plenty of honey.

The flowers of furze, broom, and plane tree, as formerly hinted, are highly grateful to bees, as all of them afford abundance of matter to collect their honey and wax from. Furze, in particular, generally flowers early, and continues long in bloſſom.

Beſides the flowers above mentioned, there is a great variety of others, which, in their different ſeaſons, afford employment and materials for the bees; ſuch as lillies, roſe-marys, yellow gowans, and the bloſſoms of crocuſes, ſnowdrops, oziers, ſallows, vetches, alders, poppies, beans, gooſeberry buſhes, and fruit trees of all kinds,

kinds. In ſhort, I know no flower that they will refuſe, when they are at a loſs for variety; for, like the poor among mankind, when a choice is denied them, they will be contented with coarſe fare; but give them their option amongſt a variety, and it will ſoon be perceived, how little they value the gaudy *ſhow*, when put in competition with *ſubſtance*; for they will fly over the fineſt gardens, and the moſt beautiful flowers, and cheerfully feed on their beloved turnips, runches, clover, and heath.

There is one thing very obſervable, that whatever flower a bee firſt pitches upon, ſhe always continues to work upon the ſame ſpecies, till ſhe is loaded, although ſhe ſhould be obliged to fly over better kinds, and even to ſome conſiderable diſtance for them; but, if the bees cannot obtain a full loading from thoſe flowers which they prefer, they ſometimes make up the remainder from other flowers.

What the honey dew conſiſts of, is diſputed among the learned. According to the ancients, it was an efflux of air, a dew which fell upon flowers. The moderns ſay, it is rather a perſpiration of the fineſt particles of the ſap in plants, which, evaporating through the pores, afterwards condenſe upon the flowers *.

"The honey dew (ſays Mr Key) is not a "liquid depoſited by the air on the leaves of "plants, as is generally ſuppoſed; for then, "like other dews or fogs, it would fall on, "and adhere to, all ſorts of plants indiſcrimi-"nately; whereas, it is found only on a *few* "particular plants; and on them but partial-"ly, for the young leaves afford none.

"This ſubſtance is as tranſparent and as "ſweet as honey, and is, in fact, perfect ho-"ney, attracted through the pores of the "leaves, by a peculiar ſultry heat; particular-"ly when reflected through clouds. Some-"times it is found on the leaves in the form "of little drops or globules. But, at other "times, being more diluted by the greater "moiſture of the atmoſphere, it covers the "leaves, as though they were ſpread with a "fine ſyrup.

"The time, in which theſe honey dews are "generally found, is from the beginning of "June to the middle of July. But it will "vary, in proportion as the weather is wet or

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* Nature Delineated.

" dry; which will occaſion them to be either
" ſooner or later. The hotteſt and drieſt ſummers
" produce the largeſt and moſt frequent
" honey dews. In cold and wet ſeaſons, few
" or none of them are to be ſeen.

" Whenever a honey dew is found, the bees
" are ſo extremely eager to fetch it, that they
" quit all other work, that their returns may be
" the quicker and more numerous; and leſt a
" gloomy change ſhould deprive them of the
" precious prize. No harveſt ſwain, dreading
" impending ſtorms, can be more anxious or
" expeditious, in haſtening the houſing of his
" crops, than theſe aerial tribes in this their
" delightful office; ſo much ſo, that thronging
" in too great numbers at the door, they
" joſtle and tumble each other down. And
" ſmarting woe to thoſe who ſhall thoughtleſsly
" ſtand in their way at this important criſis!
" Their joy on theſe occaſions, is expreſſed
" in ſuch inceſſant and loud notes, as
" to be heard at a great diſtance. By theſe tokens
" it may be known, that there is a honey
" dew, without ſeeing the trees from which
" they gather it."

A friend informed me, that he has often diſcovered both bees and ants upon the oak leaves, ſipping the honey dew; which agrees nearly with the Abbe BOISSIER DE SAUVAGES's account of it, in France, as quoted by WILDMAN, p. 86, et ſeq. For my part, although I have often travelled many miles, in the fineſt weather, to places where oaks were growing in great abundance, in order to ſatisfy myſelf on that point, yet I never could diſcover a ſingle drop of honey dew on them, or any bees to collect it. And many perſons have aſſured me, that they never ſaw a ſingle bee upon an oaken leaf collecting honey. I am, nevertheleſs, far from diſcrediting the report; as thoſe who are ſituated nearer extenſive woods, have doubtleſs much better opportunities of aſcertaining this fact, than I. And that there are honey dews to be diſcovered in ſuch ſituations, I readily believe; as I have often obſerved my own bees collecting honey from the *outſides* of the ſockets of different flowers, particularly from thoſe of the wild runches, inſtead of extracting it by their proboſcis from the *inſide.* I have ſometimes, though very ſeldom, obſerved them, in a fine morning, about ſun-riſe, buſily employed upon the leaves of the white thorn, at a ſeaſon when there was not a ſingle flower to be ſeen on it; which inclines me to think it is not an *efflux of air*, as ſome ſuppoſe, but rather a perſpiration of ſome of the fineſt particles of the ſap of plants, which, evaporating through the pores, afterwards condenſes upon the leaves. At ſuch favourable opportunities, the bees will doubtleſs ſoon fill their hives with honey; but I am of opinion, that ſuch happy ſeaſons are generally very ſhort, and that for many years they laſt but a very few days; and in ſome cold years, perhaps they ſcarcely occur at all.

Some writers believe, that when the liquor which the bees collect, has been for ſome time in their ſtomachs, it comes from thence changed into true honey; the liquor having been there properly digeſted, and rendered thicker than when it entered. Others are of opinion, that the bee makes no alteration in the honey, but collects this delicious ſyrup juſt as nature produces it, and firſt fills her bag, and then diſcharges it into the magazine; which appears to me to be the moſt probable opinion; as I have ſometimes taken a bee from a flower the moment ſhe was collecting the honey, and torn her aſunder, (although with the greateſt reluctance,)

reluctance,) to ſatisfy myſelf on that point; when I found the fineſt *blob* of honey in her bladder, exactly of the ſame taſte, colour and ſmell, with that honey which is uſually collected from ſuch flowers as the bee was working upon; for thoſe bees which I picked off the white clover, contained fine white tranſparent honey, while ſuch as were taken from heath, produced it of a high colour; and as the honey had not been above a minute in their bladders, it certainly could not undergo any change in ſo ſhort a ſpace of time. But even allowing the bees their own uſual time to collect, carry home, and depoſit the honey in their cells, the time will be found not to exceed five minutes; and yet the honey is, at this period, in as great perfection, nay, rather better, if there is any difference, than at any time thereafter: for it is proved by experience, and acknowledged by all connioſſeurs in apiaries, that the younger the honey and honey-comb are, they are ſo much the fairer and better; as, when they remain for ſome time in the hive, the combs, by the breath of the bees, gradually become of a darker colour, and the honey becomes neither ſo fair nor ſo tranſparrent, as when it was firſt collected*. From all which conſiderations, it appears plain to me, that bees are not the makers of honey, but only collectors of it; and that the honey is in as great perfection in the flowers, before the bees touch it, if not better, than it is after it has paſſed through their bodies. †

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* The author would not be underſtood here, as if he meant that honey ſuddenly underwent a change to the worſe, as it will remain many months locked up in the hives without undergoing any material change; yet, nevertheleſs, it is certain, that honey is never better, than when it is newly depoſited in the cells.

† Some alledge, that the ſyrup in the flower, by paſſing though the body of the bee, undergoes a material change, and is thereby converted into real honey. But there is no analogy between the honey extracted by the bee, to be carried home to the hive, and the meant or drink taken into the ſtomach by any other animal, to be digeſted for its nouriſhment. The former is retained in the bladder of the bee only a few minutes; whereas, the latter continues many hours, and, by the operation of the gaſtric fluid, is changed into chyle, blood, &c. The honey itſelf, when taken afterwards by the bees for the purpoſe of nouriſhment, undergoes a ſimilar change; but, in its firſt ſtate, when put into the cells, it has undergone no change whatever.

I was this day favoured with a letter from a very intelligent gentlemen, whoſe opinion, on this ſubject, although quite different from my own,—I ſhall preſent to my reader.

" Honey does not exiſt in the plant in that form, but only be-
" comes ſo by paſſing through the body of the bee. While it
" is in the flower, it conſtitutes what is called its ſaccharine
" juice

From the above reaſoning we may conclude, that every ſingle *heather bell*,* or cup of any other flower, is a veſſel containing ſome of the fineſt honey, and that nothing in nature is awanting to make our land flow with it, and thereby enable both rich and poor to feaſt upon it always at their pleaſure.

A conjecture may naturally ariſe here, that, ſeeing bees do not *make* honey, but only collect it, if we could, by any device, fall upon a plan to extract it from the flowers; or, in other words, to pour 10,000 of Nature's veſſels full of honey into one of our artificial ones, it would be aſtoniſhing what a prodigious quantity might be produced throughout the iſland.

Scotland

" juice, and, when ſucked up by the inſect, is changed by the " action of its veſſels into honey.

" In proof of this aſſertion, take a number of hungry bees, and " give them a full *meal* of ſugar, diluted in water, tear one of " them aſunder immediately after, and its bladder will be found " full of honey; now, if ſugar is ſo quickly converted into that " form, have we any reaſon to doubt that the juice of the flower " will undergo a change equally quick by the ſame means?

" I have often made this experiment, and the reſult has been " uniformly the ſame. If the bee has made a meal of white ſu" gar, the honey found in its body is white; if it has got brown " ſugar or triacle, the honey will be brown."

* Flower of heath.

Scotland alone, I will venture to affirm, would, in ſuch a caſe, produce more honey and wax, in one good ſeaſon, than would load one of his Majeſty's firſt rate men of war. But as, hitherto, no ſuch method has been diſcovered, and perhaps any ſuch attempt would prove fruitleſs, let us ſtudy to increaſe, as quickly as poſſible, the number of thoſe *natural chemiſts*, our valuable, faithful, and induſtrious ſervants, the BEES, who are every way qualified for the important taſk: having an exquiſite ſmell to direct them to the flowers containing the nectarine juice,—a *proboſcis*, or ſucking tube, to enable them to extract it,—a reſervoir to contain it,—wings to carry it away,—and fine clean veſſels of their own manufacture to treaſure it up in. And let us ever deprecate the barbarous practice of deſtroying ſuch valuable creatures, who ſeem deſigned by Nature to work indefatigably for the benefit of mankind* ; and therefore

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* We cannot more ſtrongly expreſs our deteſtation of the barbarous, and too general practice of ſmoaking hives, than in the beautiful and energetic language of the immortal Thomſon:

Ah, ſee where robb'd, and murder'd, in that pit
Lies the ſtill heaving hive! at evening ſnatch'd,
Beneath the cloud of guilt concealing night,

therefore, inſtead of death and extirpation, merit every encouragement and preſervation; and ought, at leaſt in autumn, to be allowed to retain a reaſonable ſhare of the fruits of their own induſtry, to preſerve them through the

And fix'd o'er ſulphur: while, not dreaming ill,
The happy people in their waxen cells,
Sat tending public cares, and planning ſchemes
Of temperance, for Winter poor; rejoiced
To mark, full flowing round, their copious ſtores.
Sudden the dark oppreſſive ſteam aſcends;
And, uſ'd to milder ſcents, the tender race,
By thouſands, tumble from their honeyed domes,
Convolv'd, and agonizing in the duſt.
And was it then for this you roam'd the Spring,
Intent from flower to flower? for this you toil'd
Ceaſeleſs the burning Summer-heats away?
For this in Autumn ſearch'd the blooming waſte,
Nor loſt one ſunny gleam? for this ſad fate?
O Man! tyrannic lord! how long, how long,
Shall proſtrate Nature groan beneath your rage,
Awaiting renovation? When obliged,
Muſt you deſtroy? Of their ambroſial food
Can you not borrow? and, in juſt return,
Afford them ſhelter from the wintry winds;
Or, as the ſharp year pinches, with their own
Again regale them on ſome ſmiling day?
See where the ſtony bottom of their town
Looks deſolate, and wild; with here and there
A helpleſs number, who the ruin'd ſtate
Survive, lamenting, weak, caſt out to death.

winter and ſpring; whereby they will be enabled greatly to increaſe in numbers, as well as in produce, in the courſe of the ſucceeding ſeaſon.

In the next chapter we ſhall take a view of the vaſt increaſe of the number of hives that may eaſily be made in Scotland; an object which I am happy to find already begins to occupy the attention of many gentlemen of property; and the promotion of which I hope will ſoon become general. Nothing indeed would yield me greater pleaſure and ſatisfaction, than if, by any exertion of mine, I could be inſtrumental in ſetting on foot, or carrying into execution, a meaſure of ſo much utility and importance to the public.

CHAP. IV.

REASONS WHY THERE ARE SO FEW BEE-HIVES IN SCOTLAND.

IT is not to be expected, upon my propoſed plan, that I ſhould enter deeply into the nature, generation, and properties of bees; although

though each of theſe ſubjects might afford an inveſtigation equally uſeful and intereſting. On ſuch ſubjects, I have often thought, I could write a thouſand pages, and, after all, be far from exhauſting my thoughts on them. But, without diving deep at preſent into them, or entering the liſts of controverſy with other authors, who have wrote upon them, my chief deſign in this treatiſe was—

To excite men of property, who are the only proper perſons to be addreſſed on the buſineſs, to exert themſelves with ſpirit and perſeverance to promote the increaſe of bee-hives in this country, by convincing them, that the cultivation of bees is an important object to the nation at large as well as to every proprietor of them.

To ſhow, that the prices of HONEY and WAX would be thereby greatly reduced, and conſequently theſe articles would become a ſource of national wealth; and

That Britain, inſtead of expending large ſums of money in purchaſing theſe articles from foreign countries, might even be enabled to render them an article of exportation; and therefore that they merit the attention of every patriot and real friend to his country. Alſo, To ſhow thoſe who incline to make the attempt, how to proceed in ſuch a laudable undertaking.

To give a brief account of the bee, as divided into its different claſſes of Queen, Drones, and Working bees; and to conclude with

Some plain and eaſy directions, how to manage that uſeful and induſtrious race, through the different ſeaſons of the year, ſo as they may prove of the greateſt advantage to the country at large, as well as to their proprietors.

The principal reaſon, why bees have not been reared in greater numbers in this country, is, the almoſt total neglect of them, by gentlemen of property; who ſeem, in general, to act as if they thought theſe uſeful inſects entirely below their notice; and the rearing and increaſing of bee-hives, as a buſineſs ſo very inſignificant, as to be unworthy of their patronage. Hence many gentlemen will rather purchaſe honey at the higheſt rate, than give themſelves the trouble of rearing bees; which neglect often likewiſe proceeds from an erroneous idea entertained by many, that bees will not thrive with them, and therefore the attempt would be fruitleſs. *

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* Perhaps, in former ages, bees may have been more plentiful in Scotland,

It is not the want of proper paſture, that prevents bees from thriving well every year in this country. The only preventative is the inconſtancy of the weather; for if it be windy, or cloudy, they will not go out of the hive; and, on the other hand, though the day ſhould be quite dry, yet if the weather be cold, the bees will collect very little honey.

From all the above mentioned cauſes, therefore, it is plain, that the bees and the bee-maſter, have nothing ſo adverſe to their intereſt as the mutability of the weather; and the worſt of the matter is, that nothing can be done to remedy this evil. Only the proprietor, by having plenty of good paſture at all ſeaſons, has this advantage, that whatever good weather occurs between February and September, he may have his bees ſo well ſupplied with good flowers,

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Scotland, than they have been for a conſiderable time paſt. This appears probable from different places ſtill bearing their names from theſe uſeful animals. For inſtance, in my own native pariſh of Coldingham, there is a ſteeding called *Bee-Edge*, another named *Bee-Park*, and a rivulet denominated *Bee-Burn*. All theſe places have evidently derived their names from large quantities of bees having been formerly reared in them; as they are ſituated on the ſkirts of a large common, which is now divided, and where bees would ſtill thrive well with proper care and attention, if the proprietors would exert themſelves to render theſe places worthy the names they bear.

flowers, as that they ſhall be enabled to make the moſt of it, and to collect honey (as his haymakers make hay,) while the ſun ſhines. Here it may be obſerved, that bees will thrive well, and collect a good quantity of honey in a ſhort time, if they only have three favourable days in the week, during the honey ſeaſon; as a good hive, in thirty fine days, will collect four pints of honey: beſides, many people will alledge, that their ſituation is too cold, windy, or rainy, with many other reaſons, which in fact are of no weight; for the principal reaſon of bees not thriving is bad weather; and the next chief cauſe is the neglecting to take proper care of them. Their bees indeed will ſometimes thrive long and well, with very little care, which leads their proprietor to entertain an erroneous idea, that they always will do ſo, and that hardly any care is neceſſary. But when cold, famine, or robbing bees attack his hives, and deſtroy his ſtock of bees, the lazy proprietor regrets his miſtake when it is too late.

I believe poor people, in general, make more by their bees annually, than thoſe in more affluent circumſtances; and even the latter might make far more of them than they do, if they would only ſtudy to increaſe their ſtock to a conſiderable extent. The reaſon is, that they are a kind of *eſtate* to the poor, who, when once they enter upon the buſineſs of rearing bees, take a great pleaſure in it, and, by paying proper attention to them, gradually acquire more and more knowledge in the profeſſion. And, the only reaſon why ſuch perſons do not increaſe their ſtock of hives, to a much greater number than the country at preſent poſſeſſes, is, that pinching poverty obliges them often to ſell the beſt of their hives for ready money, to make up their houſe rent: Not to add, that ſuch perſons, when obliged to leave their cottages, owing to raiſed rents, monopolies of farms, or the like, think bee-hives a very troubleſome ſpecies of property for removal. Beſides, as they keep but a few hives each, they never think of raiſing any flowers for proviſion to them. And if a perſon in ſuch circumſtances ſhould lay out 20 s. for a hive, and ſhe prove a bad one and die, he and ſome of his neighbours will perhaps ever after look upon the culture of bees as a dangerous and precarious adventure, not to be attempted by any but perſons in affluence. To obviate ſuch objections, ſhall be the ſubject of the following chapter.

CHAP.

CHAP. V.

REASONS FOR, AND PRACTICABILITY OF, INCREASING THE NUMBER OF BEE-HIVES IN SCOTLAND.

ANY perſon, who conſiders how very abundantly Scotland is ſupplied by nature, with food proper for bees, throughout almoſt every county in the kingdom, and obſerves how very few bees are reared, notwithſtanding theſe great advantages, muſt be ſurpriſed that ſo little exertion has hitherto been made in that line. For inſtance, were we to conſider, that ſome pariſhes, which might abundantly maintain 300 hives in each of them, have not at preſent 20 or 30, we muſt be ſurprized at that infatuation which has hitherto prevented us from attending more to our own intereſt. Were we to conſider our large extended heath-covered moors, and beautiful clover fields, with the great quantities of runches, wild muſtard, &c. that grow ſpontaneouſly in our corn fields, together with the many elegant gardens, nurſeries, &c. raiſed by art, in the neighbourhood of this metropolis, and almoſt every other town in Scotland, as well as the country ſeats of our gentry, together with thoſe numerous wild flowers that grow in our meadow grounds and paſture lands, we might juſtly ſay, "the HARVEST truly is GREAT, but the LABOURERS "are FEW."

And here I ſhall mention a thought, which ſtruck me lately in a gentleman's garden, and indeed has often ſtruck me in ſimilar ſituations;—"Here I am ſurrounded with a variety of fine flowers, and the proſpect all around me is equally pleaſant and delightful! What a variety of Nature's beauties and ſweets are here exhibited, and how many thouſands of millions of ſockets of flowers there are, in the vaſt number of gardens in this metropolis and its environs!—and yet, the infatuated inhabitants and proprietors rather allow the honey contained in theſe beautiful veſſels to be waſted, than employ a few of thoſe faithful ſervants, provided by nature, to extract and collect it for them:—Servants, who would chearfully labour, without wages, and find themſelves in food and cloathing during their employment, if the proprietor would only provide them a few ſmall lodgings. Will theſe people ſtill rather be at the expence of purchaſing honey from me, or others, at a high rate, than rear hives to manufacture it for themſelves? Will they continue to ſend their money to Dantzick, for honey of a far inferior quality, rather than encourage the produce of it at home?—Why do not the gentry of Edinburgh and the neighbourhood, eſpecially thoſe who live in the confines of the city, repleniſh their gardens and nurſeries with ſome hundreds of hives, which they are ſo well able to fill?" Similar reflections have often ſtruck my mind, when I have ſeen extenſive fields, abounding with white clover and heath, where the flowers, like the ſtars of heaven, or the ſand on the ſea ſhore, could be numbered not by units, tens, hundreds, or thouſands, but by *millions*!—Suppoſe, for example, 1 ſquare yard of heath or clover to contain 500 cups of flowers, each one of which contains ſome honey, what an immenſe number would be contained in an extent of 6 ſquare miles?

Some however here may reply, that a field may be overſtocked with bees, as well as with ſheep or black cattle. I will grant that there is a poſſibility of this, but I will venture to affirm, that ſuch a thing has ſeldom ever yet happened in Britain*. Or, at leaſt, if there is, or ever was, any one place in the iſland overſtocked with them, there are twenty other places, which never reared the fourth part of the number that they were able to maintain. Nay, there are many excellent ſituations for bees, which perhaps never had 20 ſtock hives on them, although by nature abundantly provided with excellent paſture for many hundreds.

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* There are ſome few places, indeed, ſuch as white benty ground, where there is ſcarcely a heath, clover, muſtard, or runch flower to be ſeen, nor even any furze, broom, or plane trees growing, and which are almoſt quite void of all other flowers. Such places are certainly very bad ſituations for bees, and they will never thrive on them, or on any ſimilar unproductive grounds. There are again ſome other places, which have but a few natural flowers, and where no artificial ones are reared. Such places may perhaps have hardly a ſufficient quantity of flowers in eight miles circumference, to feed eight ſtocks of hives; Whereas, in more favourable ſituations, the ſame extent of ground could eaſily produce as many flowers as would feed eight ſcore. There are ſome other grounds, which are excellent for producing corn, but which perhaps have little clover, muſtard, or runches, in their neighbourhood, and neither gardens nor moors within reach. Such places are naturally bad ſituations for bees; but by rearing ſome turnips, muſtard, or clover, and ſome furze in hedges, or on waſte grounds, they may eaſily be rendered excellent ſituations for theſe uſeful inſects.

dreds. For, as has been often mentioned, when we conſider the vaſt quantity of flowers, which the earth naturally produces, and which might be ſtill much more increaſed by art, how prodigiouſly great may we eſtimate the total? This conſideration may convince us of the little danger we have of running into the extreme of overſtocking our fields with bees.

Some may perhaps alledge, that if there were twenty times more hives in Scotland than there are at preſent, the produce, in a bad ſeaſon, would ſtill be very trifling: But this is a very childiſh objection; for, even in the worſt of ſeaſons, the quantity of honey produced, would, by proper care and attention, ſtill be twenty times greater than, in ſuch a ſeaſon, it is at preſent. For inſtance, were there but one hive in all Scotland, in a cold rainy ſummer; even that hive would produce but a very ſmall increaſe, perhaps ſwarm only once, and that ſwarm produce but only one pint of honey; whereas, if there are 100 hives, granting the weather to be equally bad, the produce muſt be at leaſt 100 pints of honey. Eſtimating the number of pariſhes in Scotland, capable of raiſing bees, to be only 800, which I think is below the truth, the following calculation will give a view of the immenſe quantity of honey that might be produced, even in ordinary favourable years.

	Hives.		*Pints of Honey.*
Suppoſing, (which is moderate)	1	to produce	4
Then 1 hive in each pariſh -	800	produces	3,200
Suppoſing the number in each pariſh increaſed to 30, -	24,000	will produce	96,000
But ſuppoſing, (which is ſtill very moderate) the number in each pariſh increaſed to 100 - - - -	80,000	will produce	320,000
Suppoſing the number in each pariſh increaſed to 400 -	320,000	will produce	1,280,000
			lbs. of wax.
Beſides wax, which at 1lb. each hive, is - -			80,000

But there are many pariſhes in Scotland ſo very large and extenſive, and ſo full of rich flowers, that I believe 1000 hives erected in each of them, would not contain bees ſufficient to extract the one half of the honey contained in their flowers, in favourable weather; and therefore, it would not be eſtimating the poſſible increaſe of honey, all over Scotland, too high, to ſtate it at near 2,000,000 of pints of honey. For example, the pariſh in which I reſide, was ſo richly provided laſt year with abundance of fine white clover, wild muſtard, and heath flowers, &c. that 1500 hives of bees, placed properly on it, would not have nearly exhauſted its flowers of their honey. To what an aſtoniſhing extent then might the bee-huſbandry be carried? *

But leſt I ſhould be thought extravagant, in my calculations and ſtatements of the profits to be made from theſe uſeful animals, and inclined to lead my readers to build *caſtles in the air*, inſtead of erecting hives in their gardens, I ſhall mention a few facts out of many on this ſubject, which I can vouch, either from my own concern in them, or upon the authority of perſons with whom I am particularly acquainted, and who informed me how much they had made of their bees laſt ſeaſon.

To a perſon near Greenlaw, I paid for honey and wax, above, - - - -	L. 4	0	0
To another near Dunſe, for ditto, above, - -	11	0	0
To another, near Hamilton, I paid for *one hive*, which was weighed in the Edinburgh Weigh-houſe, - -	4	0	0

For

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* But it is neceſſary to caution the reader here, that, in a very bad ſeaſon, it perhaps could do little more than produce the fourth part of that quantity; not for want of abundance of flowers with honey in them, but for want of favourable weather for them to go and collect it. See pages 7, 9 and 29.

For 40 hives, purchaſed from different perſons, ſome of them at above 2l. Sterling each, I paid - -	70	0	0
A friend in Mid-Lothian aſſured me, he had cleared laſt ſeaſon, by his bees, no leſs than - - -	12	0	0

All of theſe perſons had but a very few ſtock hives at Whitſunday, and yet they made, at an average, above 30s. by each of their hives. But had they increaſed their ſtock, they might eaſily have made ten times more than they did.

With regard to the profit ariſing from bees, one conſideration ſhould not be overlooked, *viz.* that almoſt the whole produce, ariſing from the ſale of both honey and wax, is in a great meaſure clear profit; as bees, and bee-hives are, particularly in Scotland, equally free from rents and taxes; and the culture of them does not in the leaſt injure or impede any other improvement, in any reſpect. Nor do they require a conſtant attendance, as moſt other articles of improvement do; for a proper perſon might eaſily overſee, with a little aſſiſtance in ſwarming time, at leaſt 500 bee-hives. And as Nature has amply ſupplied them with food, and with powers to provide it for themſelves, they put their owners to little or no expence for that article; which cannot be ſaid of any other of our ſervants whatever.*

Thus, by following the above plan, with a little attention and exertion on the part of our landed gentlemen, ſuch a number of bee-hives would ſoon be raiſed all over the kingdom, that the quantity of honey and wax would be increaſed to ſuch an extent, as to produce the greateſt advantages to the nation at large, as well as to the private proprietors of the hives. All the money ſent to foreign markets for theſe commodities would be kept at home; which would be a ſaving of perhaps not leſs than 50,000l. a-year. And honey would be produced in ſuch abundance at home, as to ſupply the poor, as well as the rich, not only with a delicious *luxury*, but alſo with an excellent ſubſtitute for ſome *neceſſaries*.

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* Here I have in view Scotland in general, as it has many hundreds of ſituations where bees would thrive well, but where not a ſingle flower is ſown for that purpoſe; but even were this plan adopted, of rearing artificial flowers in thoſe places, where a ſcarcity of natural flowers prevails, during part of the working ſeaſon, in order to ſupply that defect, and thus afford the bees abundance of proviſion at all times, ſtill the expence would be ſo trifling, that it is ſcarcely worth taking notice of; as is already hinted, p. 12, &c. for, ſhould we plant ſome trees, with a view to aſſiſt bees, we have their wood; if we rear turnips, we have their ſeed; if we ſow white clover, we have the beſt of paſture; and if we even allow furze or broom to overſpread waſte grounds, we can be at little loſs, as even theſe have alſo their uſes, by ſupplying us with hedging, fuel, ſhelter for ſheep, &c. I wiſh not to be here underſtood, as if I meant to recommend the ſowing of large fields purpoſely with food for bees, excepting white clover, which provides food for larger animals: All that I intend is, that gentlemen, who have great ſtocks of bees, and plenty of ground, may eaſily ſpare three or four acres, out of as many hundreds, for the rearing of turnips, muſtard, furze, broom, &c.

It might, for inſtance, be converted into *mead*, a fine well-taſted wholeſome liquor, which would prove an excellent ſubſtitute for ſtrong ale and porter, and could be ſold at a very moderate price. A weaker kind of mead, called *bragwort*, could alſo be made of it. This is an agreeable wholeſome liquor, much eſteemed by many, who uſe it as a ſubſtitute for ſmall beer. When properly made, it will keep long: And when of a proper degree of ſtrength, it is ſo highly exhilarating, that many perſons have been ſent home half intoxicated with it.

The increaſe of the quantity of honey would alſo reduce the price of it ſo much, that inſtead of paying 10d. or 1s. *per* pound for it, as at preſent, it might be ſold ſo low as 3d. *per* pound, in which caſe it would prove an excellent ſubſtitute for butter to the poor. Even at the preſent prices, it is already uſed by many perſons mixed with butter.

As to the wax, almoſt every perſon knows the great uſes made of that article, in medicinal preparations, wax candles, ſealing wax, &c. &c. as well as the high eſteem in which wax candles and wax tapers, are held by perſons in the higher ranks of life, on account of their clear light and odoriferous ſmell, as well as their freedom from all danger of greaſing any thing, as tallow candles do, when a drop falls from them.

CHAP. VI.

HOW TO INCREASE THE NUMBER OF BEE-HIVES IN A FEW YEARS IN SCOTLAND.

I PROCEED next to ſhow, in what manner the number of bee-hives may be ſpeedily encreaſed in Scotland. If a gentleman of property has a proper ſituation for bees, and the above reaſoning has inclined him to commence the cultivation of bees with ſpirit, let him apply to ſome perſon tolerably ſkilled in that branch of ſcience, and let him purchaſe 100 or more bee-hives, in the month of Auguſt, and place them properly, according to the directions which ſhall be laid down hereafter. Let him next rear a ſufficiency of turnips in their neighbourhood, that they may bloſſom next ſpring; and in the month of February, let him ſow ſome muſtard ſeed, and ſome furze and broom upon dykes, or waſte ground. Gentlemen of property, who have any ground proper for planting, ſhould by all means plant a number of plane trees and ſallows. They ſhould likewiſe ſow a good deal of white clover, ſweet reſida, or mignionette, &c. with any other flowers that will grow upon the ground, either by nature or art.

In winter, particular care ſhould be taken to preſerve the bees from cold; in ſpring, from famine, and robbery by other bees. And when they are ready to ſwarm, great care muſt be taken to lodge them in proper habitations.

With ſuch attentive management, I can venture to aſſure all who will makethe experiment, that 100 well-choſen ſtock-hives, will, in a tolerably good ſeaſon, produce from 180 to 200 or even 220 hives, whatever more.

Some may object, that, while the proprietor, who wiſhes to increaſe the breed of bees, raiſes many flowers for that purpoſe, his neighbour, who, perhaps, takes no trouble of this kind, may ſhare the benefit, by his bees coming and feeding upon them §. To this it may

§ I was ſent for on the 23d of May laſt, by a gentleman in Edinburgh, who wiſhed me to bring him a hive of bees, and to pitch upon the moſt proper ſituation for placing it in his garden. The day being very fine, and the fruit trees in full bloſſom, there was a pear tree among many others, which was full of fine bloſſoms: Obſerving a number of bees buſily employed upon them, be ſufficient to reply, that the induſtrious proprietor, having done every thing in his power to

ſupply

them, he told me, "they belonged to his *neighbour*, who lived "a few yards from him."—"Perhaps not," replied I, "for a "bee will fly far for food in fine weather: and, therefore, theſe "bees may come from Leith, or ſome other place as far diſtant, "while your neighbour's bees may fly as far as Leith for their "loading."

As for the reaſon why bees will ſometimes travel a mile or more for a heavy loading, when they could get the ſame quantity and equally good, from the ſame ſpecies of flowers within a few yards, I can ſcarcely hazard a conjecture; unleſs it be, that perhaps ſome of the old and experienced bees, from a miſtaken apprehenſion, may ſuppoſe thoſe flowers near their hives to have been exhauſted, by the moſt part of the hive having had conſtant acceſs to them, and feeding on them; as is ſaid of the old cattle, that they commonly feed on the borders of their paſture grounds, where few of the younger cattle have previouſly fed. But, as a proof of the fact, let any perſon who has one or two hives, with abundance of flowers to keep his bees conſtantly employed, within 100 yards of their hives, make the experiment, by going to another place, where there are alſo flowers growing 1000 yards diſtant from his own, or any other perſons bees, and he will find a great number of bees at work on the diſtant flowers.

But though ſome bees, by being expeditious travellers, ſeem to diſregard diſtance, and to be fond of undertaking long journeys even when loaded, yet, in general, I believe, the greater part of them are wiſe enough to collect their loading as near their hives as poſſible. And, therefore, the nearer the flowers are ſituated, the more work will they perform, and the greater quantity of honey will be carried home in a day. For this reaſon, I have already adviſed the hives to be always placed as near as poſſible to plenty of proviſions.

ſupply his own bees with ample proviſions, will have the pleaſure to ſee them feed and thrive upon it; and ſhould thoſe of his neighbours occaſionally partake, he will not have any reaſon to regard it, there being no danger of a famine. But to obviate this objection completely, let ten (or more) perſons in a village, or neighbourhood, join together and contribute equally in proportion to the number of their hives, to rear a ſufficient quantity of flowers amongſt them, and upon this amicable plan, the expence of each proprietor will be exactly in proportion to the number of his hives.

Suppoſing, that there are, in May 1795, twenty ſtock hives in each pariſh in Scotland, the amount in 800 pariſhes would be 16,000. Then, ſuppoſing each of theſe hives to throw one ſwarm, which would probably keep through the winter, in September we would have 32000 ſtock hives. At this period, let every gentleman, who rears bees, keep all his hives, young and old, for ſtock hives, that are fit for it*:

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* All ſtocks, or firſt ſwarms, and even ſome ſecond ſwarms, will probably anſwer for that purpoſe; and all ſwarms which are nearly full of combs, but rather light, ſuch as I would not adviſe to be kept, if they were not ſpeedily to increaſe the ſtock; by keeping them

Let the poor, who are able, do the ſame with theirs;—and let thoſe, who are not able to lie out of the produce of their bees, ſell them to thoſe who are inclined to purchaſe them for ſtock hives. By doing this, they will raiſe as much honey as if they killed all the bees, and ſold the honey and wax†, and with far leſs trouble.

On theſe principles, by keeping 32,000 ſtock hives, with proper management, during a tolerable ſeaſon, and always preſerving all that will preſerve, for the ſpace of ſeven years, the ſtock would increaſe as follows: viz.

HIVES.

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them, and feeding carefully with courſe honey, which might be purchaſed from any foreign market, where it could be got at the cheapeſt rate. For this purpoſe, two or three very light ſwarms, which are not fit to be kept for ſtocks ſeparately, might, by conjoining both bees and honey, form a good ſtock hive. And all hives, containing honey or combs, whoſe bees deſert them from whatever cauſe, during any ſeaſon of the year, might be kept carefully, to lodge new ſwarms next ſeaſon. The method of uniting, feeding, &c. will be deſcribed in their proper places; and by following the directions laid down under theſe heads, our hives would in a ſhort time turn out very numerous.

† But ſhould it here be aſked, How are we to be ſupplied with honey during the time of rearing the ſtock hives? we may reply, that it may be purchaſed from other counties, in order to ſupply ourſelves, as well as to feed our weak hives.

					HIVES.
In the	1.	year, Sept.	1795,	there would be	32,000
——	2.	—— ——	1796,	——	64,000
——	3.	—— ——	1797,	——	128,000
——	4.	—— ——	1798,	——	256,000
——	5.	—— ——	1799.	——	512,000
——	6.	—— ——	1800,	——	1,024,000
——	7.	—— ——	1801,	——	2,048,000

Thus, within the ſhort period of ſeven years, the number of our bee-hives would be increaſed to no leſs than TWO MILLIONS and FORTY EIGHT THOUSAND HIVES. But allowing the forty eight thouſand to be diſcounted for dead hives, there would ſtill remain two millions of ſtock hives. Although this number may appear to be large, yet there is no reaſon to ſuppoſe, that the calculation is neither impoſſible or improbable. But, even dropping the one half of this number, upon the ſuppoſition of loſſes by bad ſeaſons, &c. there would ſtill remain, at the loweſt eſtimate, a clear MILLION of ſtock hives; which, next year might produce FOUR MILLIONS of PINTS of HONEY, and ONE MILLION of POUNDS of WAX; and ſtill keeps the ſtock entire. With ſuch a quantity, indeed, of theſe uſeful animals, and valuable commodities, we might reſt contented; as ſuch a quantity, beſides every other advantage, would afford employment to hundreds of old and poor people to watch them in ſwarming time, and to make hives to receive the young colonies.

Another method, by which the number of our ſtock hives may be more ſpeedily increaſed in this country, might eaſily be adopted. Should any one opulent proprietor, or a company of individuals, incline to have 2000 or 3000 bee-hives, let a commiſſion be ſent by a proper perſon to Poland or Ruſſia, where, in the month of Auguſt eſpecially, they could be purchaſed at one third part of the price they generally draw here: And I am perſuaded, if the Dantzick hives are made much in the ſame form with ours, or in any other form that will admit of carriage, a ſhip nearly loaded with other goods, which would help to pay her freight, might bring over a great number of them. Perhaps many will think this an extravagant attempt, but I am ſo confident of its ſucceſs, that if I were poſſeſſed of 1000 l. Sterling in ready caſh, I would ſet ſail for Dantzick, and riſk 800l. of it upon the adventure. On bringing home my cargo of living bees, I would ſpread them all over the kingdom: But, before ſetting out upon ſuch a voyage, I would firſt inform myſelf properly about the form of the Dantzick hives, as well as about their prices, and whether they are to be got near the ſea-coaſt; as land carriage of bees is equally troubleſome, expenſive, and dangerous: But I would not be afraid to riſk 1000 bee-hives on board a ſhip; for, I would rather carry them 4000 miles on ſhip-board, when properly packed, than 100 by land.

CHAP. VII.

ACCOUNT OF THE QUEEN BEE.

THE QUEEN, or MOTHER BEE, is eaſily diſtinguiſhed from all the other bees in the hive, by the form, ſize, and colour of her body. She is conſiderably longer, and her wings are much ſhorter in proportion to her body, than thoſe of the other bees. The wings of both common bees and drones, cover their whole bodies, whereas thoſe of the Queen ſcarce reach beyond the middle, ending about the third ring of her belly. Her hinder part is far more tapering than thoſe of the other bees: Her belly and legs are yellower, and her upper parts of a much darker colour than theirs. She is alſo furniſhed with a ſting, though ſome authors aſſert that ſhe has none, having been induced to form this opinion, becauſe ſhe is extremely pacific; ſo much ſo, indeed, that one may handle her, and even teaze her as much as he pleaſes, without provoking her reſentment. For my part, I never could excite a Queen Bee to draw her ſting, nor could I even get a ſight of it, but when I preſſed her body. The omniſcient Governor of Nature has wiſely ordained this majeſtic inſect to be of a pacific diſpoſition; for, were ſhe otherwiſe,—were ſhe, like the other bees, of ſo irritable a temper as to draw her ſting on every occaſion, and to leave it in the body of her antagoniſt, it would prove of dangerous and often fatal conſequences to the whole hive; for every bee, after loſing her ſting, dies within a day or two at the utmoſt.

The Queen bee is ſolemn and calm in her deportment. A young Queen is a great deal ſmaller in ſize than a full grown one; being not much longer than a common bee, and is therefore not ſo eaſily obſerved when ſought for.

When only three or four days old, ſhe is very quick in her motions, and runs very faſt; but when pregnant with eggs, ſhe becomes very large, and her body is heavy. When travelling, ſhe drags along in a very ſlow manner, and is not very expeditious in flying. It is proper that every proprietor of bees ſhould know the Queen, as it may often be of great advantage to him. The ſureſt way to know her is to get a ſight of one from ſome acquaintance, who keeps hives: or, if this cannot be obtained, he may ſearch for her, by the above deſcription, among ſome ſmall hives.

That this majeſtic animal is a female, the very deſignation ſhe bears, of QUEEN, ſeems to imply that all modern authors are convinced, though many of the ancients were of a different opinion. But as it is alſo now unanimouſly admitted, that ſhe lays every egg in the hive, ſhe ought rather to be called the MOTHER BEE. For, indeed, from the beſt obſervation that ever I could make, ſhe poſſeſſes and exerts NO SOVEREIGNTY over the other bees. She evidences the greateſt anxiety for the good of the commonwealth, with which ſhe is connected; and, indeed, every member of it ſhows an equal regard for her welfare. But I never could obſerve,

ſerve, that ſhe iſſues any poſitive orders, to be punctually obeyed by the other bees. The truth ſeems to be, that ſhe and the other bees are all equally acquainted with their duty by *inſtinct*, and have an equal pleaſure in performing it, without waiting for orders from each other. That there is, nevertheleſs, the greateſt order and regularity among them, is certain; for they lay their plans and execute them in the beſt poſſible manner, by the influence of the above powerful ſubſtitute for reaſon.

Almoſt all writers, as formerly hinted, are of opinion, that the Queen lays three different kinds of eggs; viz. one kind for the production of a Queen Bee; another ſpecies for that of the working bees, and a third for producing the Drones. It was alſo long a received opinion, that no Queen could lay eggs, that were capable of producing bees, without the aſſiſtance of Drones. SCHIRACH †, on this ſubject, refutes this doctrine, and entirely denies ſuch an uſe of the Drones. He advances this opinion, that "the Queen lays eggs, which produce young "bees, without any communication with the

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† Paſtor of KLEIN BAUTZEN, in UPPER LUSATIA, and Secretary to a Society of Naturaliſts there.

" Drones; and affirms that all the working " bees are females in diſguiſe; every one of " whom, in an early ſtage of her exiſtence, was " capable of becoming a Queen; from a knowledge of which fact, ſwarms may artificially " be obtained from the early months of ſpring, " and in any ſucceeding month, even to November."

His experiments have been very numerous, and obviate every doubt and objection. He performed the operation, upon one and the ſame ſtock, for at leaſt fifty or ſixty times, from mere fragments of the combs, &c. &c. This novel and wonderful doctrine excited no ſmall contention, and not a few counter experiments among naturaliſts on the Continent, without being decided even by the great BONNET. He aſſerts, which is indeed the grand and deciſive proof, that " the practice of this art, (of raiſing artificial Queens,) has already extended " itſelf through Upper Luſatia, the Palatinate, " Bohemia, Bavaria, Sileſia, and ſeveral parts of " Germany, and even of Poland."

That a Queen can be raiſed from an egg in a common cell, or, in other words, that the ſelf-ſame egg is capable of being reared up to be either a Queen, or a common bee, as the bees pleaſe, appears to me, from my own experiments, to be paſt a doubt; and that a Queen, who never ſaw a drone, can lay eggs, which will produce bees, is equally certain. Both of theſe facts will, I flatter myſelf, appear to the curious and learned reader, to be clearly aſcertained by the following experiments.

Long before I heard of Mr Schirach's theory, or experiments, I had often taken off ſwarms, without leaving any Queens or royal cells in the mother hive; notwithſtanding which, they bred young Queens, which ſurprized me greatly how they had obtained them, as the received opinion then was, that they could not breed a Queen bee, if the old Queen was taken away, before a royal cell was erected. But after ſeeing Schirach's ſentiments on this ſubject, I thought his theory extremely probable, according to what I had obſerved among my own bees; and reſolving to aſcertain the truth of it, I made many experiments of my own, which all ſucceeded to my wiſhes. But, in order to put the matter beyond all doubt, I ſhall relate an experiment I made with a hive in ſpring 1788, two months before the uſual time of ſwarming, and which clearly aſcertains both the facts at once. The hive was beginning to carry well, and to breed faſt, but it was not half full of bees. It had only one Queen, but neither Drone nor royal cell; neither of which could be expected at that ſeaſon of the year, as it was about the middle of April. I took out the Queen, and moſt part of the bees, and left the hive with only ſome common bees, to hatch out the young brood in the cells, and provide themſelves with a Queen, but without leaving one ſingle Drone. They did not diſappoint me; for as ſoon as the melancholy intelligence pervaded the hive, that their loving mother was torn from them, they made a mourning kind of noiſe for their great loſs, for about two hours; After which, a general council, as it would ſeem, being called, the moſt experienced ſages, in the diſtreſſed republic, may be ſuppoſed to have adviſed their brethren, "That it was in vain to mourn longer for the loſs of their mother and brothers; that although they were gone, and although they had at preſent no royal cell to raiſe another mother, yet they had ſtill ſufficient reſources from nature and their own induſtry; that they had power and means to raiſe a young monarch to the throne; that they had plenty of new laid eggs, and therefore

fore no time was to be loſt, to raiſe a Queen bee from one of them; otherwiſe the eggs would all ſoon produce common bees, and then all hopes of future progeny would ceaſe for ever, and their republic utterly periſh, for want of a prolific mother to preſerve and perpetuate the race."

That the bees ſeemed to have had ſome ſuch reaſoning among them, appeared pretty evident from their conduct; for about two hours after the capture of the Queen, they all fell buſily to work, and exerted themſelves amazingly for two days; ſome being employed in forming the royal cell, and others in injecting into it a large quantity of thick whitiſh liquid ſtuff, pretty much reſembling cream. At the end of the 3d day, the royal cell was completely formed; and, in the mean time, the common cells were ſealed up by the other bees, who all continued buſily employed. On the fifth day, the royal cell was conſiderably enlarged, and I obſerved as much of the aforeſaid white ſtuff in it, as would have half filled a thimble almoſt, with a white maggot lying on the top of it. On the ſeventh day, the bees ſealed it up, and, on the ſeventeenth day, the young Queen came forth out of her little palace, in all her pomp and majeſty. On the twenty-fourth day, the young Queen became a MOTHER, and laid eggs; on the thirty-firſt day, theſe eggs were ſealed up, and, on the forty-third day, a number of young bees emerged from the cells. About the ſame time I repeated this experiment with other two hives, which both ſucceeded equally well.

I made another experiment with a different hive, out of which I took the Queen and moſt part of the bees. This hive had neither a royal cell nor drones in it, yet, in ſeventeen days thereafter, a Queen was reared, and on the 25th day ſhe laid eggs. I then took out the young Queen again, leaving ſome new laid eggs in the old hive. Within eight days after, there was another royal cell erected and ſealed up. This I immediately took out of the hive; but, upon inſpecting the hive eight days thereafter, I found neither Queen, eggs, nor royal cell, none of which indeed I expected. Upon taking a piece of comb, however, with eggs in it, out of another hive, and putting it into this hive, the bees erected another royal cell, which in due time produced another young Queen.

The advocates for the doctrine of the drones being males, and their aid being neceſſary for the propagation of bees, may perhaps plead, that although there were no drones in the hive, when I took the Queen from it, yet there might have been eggs laid in drone cells, which would come forward to be drones as ſoon as the young Queen, and ſo impregnate her, and render her fit for breeding. But the contrary is the fact: for, when the old Queen was taken out of the hive, there was not a ſingle egg in any of the drone cells. If there had, I would have ſeen the bees ſitting upon the cells of the drone combs, as they did on thoſe of the common bees, and on the royal cell. Beſides, I turned up the hive every ſecond day, during the whole period of forty-three days, in order to determine how long the bees took to erect the royal cell, and ſeal it up; how many days elapſed before an egg produced a Queen; how old the Queen was, before ſhe began to lay eggs; how many days paſſed, before theſe eggs produced common bees; and, above all, whether the Queen needed the agency of the drones, to enable her to become a mother. To arrive at a certainty on this point, I often turned the bees over in the hive with a ſmall ſtick, in ſearch of young drones in drone cells, but could not diſcover the ſmalleſt veſtige of them. But the young Queen, on the 10th day of her age, began to lay eggs in drone cells, which produced young Drones in the hive about ſixteen days thereafter. Having repeated this laſt experiment again and again, I can now affirm, with the utmoſt confidence and certainty, that the common, or working bees, are endowed with the powerful faculty of raiſing a Queen bee, from an egg, in a common cell, when their community ſtands in need of one.

Their method is this: They make choice of a common cell with an egg in it, and inject ſome white liquid matter, from their proboſcis, of a thickiſh ſubſtance. They then begin to build upon the edges of the cell, and enlarge it. On the third day, it appears fairly on the outſide of the comb, in the form of a royal cell, and may now be properly ſo denominated. On the fifth day, the cell being now greatly enlarged, and a great deal of the whitiſh matter thrown into it, the royal maggot appears in the form of a ſemicircle, not unlike a new moon, being biggeſt in the middle part, and ſmall at each end. In this form it is to be ſeen for two days, ſwimming on the top, and in the midſt of the ſaid matter in the cell; and on the ſeventh day it is ſealed up.

During this period, our young princeſs undergoes various metamorphoſes. I have opened the royal cell on the tenth day, and have found the maggot ſtill on the top of the white liquor; and having taken it into my hand to ſhow it to any friend, it would have moved for a ſhort time, although at this period, it had not the ſmalleſt reſemblance to a bee, being ſtill only a maggot. But on the fourteenth or fifteenth day, the metamorphoſis is ſo complete, that inſtead of a groſs white worm, forth comes a charming young Queen Bee,[†] arrayed in all her glory. From the whole of theſe experiments, therefore, which I have repeated on various occaſions, I can poſitively affirm, that the Qeen Bee is capable of becoming a mother, without ſo much as ſeeing a drone; and that the doctrines of almoſt all former writers on this ſubject, (Schirach and one or two more excepted,) who affirm that the Queen cannot breed without the agency of the drones, or males, as they call them, is founded on a miſtake. For a ſmall piece of comb, with common eggs in it, may be taken and put into a box along with 400 common bees, and tranſported 1000 miles from a Drone; and yet the bees will rear a Queen from one of thoſe eggs, and that young Queen will lay eggs, which in due time will produce Queens, commons and drones. But whether every egg in the common cells of the hive can be nouriſhed up to produce a Queen, I dare not poſitively ſay; although I am much inclined to think ſo, as I can ſafely affirm, that not above one in a dozen of my experiments, in rearing Queens from what are called *common eggs*, (i. e. eggs that commonly produce working bees,) has ever yet failed, when I either made the trial by way of experiment, or adopted the plan as a matter of œconomy. Sometimes a ſingle egg has failed in making the experiment; but this might have happened from ſome other accidental cauſe. As a proof of this, I offer to rear 20 Queens, if not 30, out of one hive, during the courſe of one ſummer. For I have, within theſe laſt ſix years, cauſed the bees to rear, from eggs taken from common cells, which the bees would otherwiſe have reared up for working bees, no fewer than 200 *artificial* Queens; and which Queens laid eggs, that came forward to be bees, in the ſame manner as other Queens, which may, for diſtinction's ſake, be ſtiled *natural* ones.

[†] The ſame proceſs, or nearly ſo, is uſed by the common bees, to bring forward both their own ſpecies and drones, by throwing the whitiſh matter on the eggs, and ſealing them up, till the maggots undergo the uſual changes in the cells, &c. And each egg generally produces a bee in about fourteen or ſixteen days. I have ſeen them differ two or three days in point of time. Perhaps an egg, ſhould the bees let it alone and inject no matter upon it, might, nevertheleſs, keep warm for 8 days, and produce a bee at laſt,

Sometimes, when I have taken the Queen out of a hive, and left none but common bees in it, after looking for the ſpace of fourteen or ſixteen days, for royal cells, as uſual in ſuch caſes, I have obſerved, that, inſtead of Queens being produced, there were three or four royal cells, which contained nothing in them, except that ſome of them had a red tough matter, of a hard kind of ſubſtance, about the ſize of a pea, which would tear, but would not break: while others of them would have contained neither egg, maggot, nor chryſalis, but were quite empty. Theſe empty cells I ſhall, for diſtinction's ſake, call *falſe royal cells.* What was the intention of the bees, in rearing theſe falſe royal cells, I cannot determine. The bees were ſurely ſenſible, that there were no young bees in them: and yet they would have allowed them to continue in the hive for many months. One circumſtance inclines me to think, that the bees intended them to be of ſome uſe for rearing Queens, as I never ſaw theſe falſe royal cells reared, but when the hive wanted a Queen. I am equally certain, however, on the other hand, that I have never once ſeen an egg or decayed maggot in any of them. I own that ſome common cells will ſometimes be ſealed up, as if there were young bees in them, although none would ever appear. All of theſe, however, had eggs in them at firſt, which had decayed and rotten, by cold or ſome other accident. But this I never found to be the caſe, in thoſe falſe royal cells, not one of which appeared to have ever had one in them. Therefore, when we leave a hive without a Queen, we cannot poſitively ſay, that the bees will rear one for themſelves: yet were the practice eligible in every other reſpect, we might truſt to it, as ſcarcely one caſe in a dozen fails. But if a royal cell, on the 2d, 3d, or 4th day, after it is erected, appear to have an egg, or ſome of the whitiſh matter in it, a Queen may be depended upon, to be produced in due time, if no accident prevent.

That the Queen and the common or working bees are of the ſame ſex in the egg, and yet that they can rear up bees of every ſpecies between them, appears to me to be no more wonderful than true *. Whether the additional matter thrown into the enlarged cell, along with the egg, is of a generative or nutritive nature, I cannot yet poſitively determine, altho' I rather incline to think it is of the former kind.—But there are conſiderable difficulties on both ſides. For, if we ſay the white matter is of a generative quality, then we muſt ſuppoſe that the working bees are males; although it muſt appear very unaccountable, that the *ſame egg* ſhould be capable of rearing either a *male* or a *female*, at the option of the working bees:—which, however, upon this ſuppoſition,

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* Whether the bees can rear up one of thoſe eggs that are laid in drone cells, to become a Queen or a common bee; or whether they can rear eggs that have been laid in common cells, to become drones, is not yet aſcertained. This queſtion, however, might eaſily be decided, by putting a piece of comb with drone eggs in it, along with 400 common bees; and, by repeating the experiment 6 or 8 times, it might ſoon be diſcovered, whether the bees could raiſe one of thoſe drone eggs to be a Queen bee. I rather incline to think, that the eggs laid in drone cells cannot be raiſed to be any other but drone bees, and that thoſe laid in common cells can never be reared to become drones.

appears clearly proved, by Schirach's experiments and my own. On the other hand, if we hold it to be of a nutritive nature, then we ſuppoſe the Queen to be a hermaphrodite, or *ſelf-prolific*, without the aſſiſtance of any other creature. It is indeed reported, that the whole genus of ſnails are hermaphrodites, and that each individual of the ſpecies is endued with both ſexes.

But although I have not a doubt as to the fact, that an egg in a common cell is capable of being nouriſhed up to produce a Queen, yet I rather doubt, whether any great improvement can be made of this diſcovery, ſo as to increaſe the quantity of honey and wax; as it is not a great number of hives that will produce that effect, but only real good ones. I alſo doubt, whether more hives can be reared by this method, as our bees generally produce more Queens naturally, than they are able to ſupply with a ſufficient number of common bees to compoſe a proper ſwarm with; as appears from their killing the ſupernumerary ones, which they have no need of.—Often, for inſtance, in a garden containing four ſtock hives in May, they will breed perhaps 24 Queens during the ſummer, but will kill two thirds of them, and ſend off the other 8, with as many young ſwarms.—It muſt be allowed, however, that hives will ſometimes ly long out; and, therefore, if the owner had a ſpare Queen, he might eaſily rear new ſwarms with them, which he cannot ſafely do without them.

CHAP. VIII.

ACCOUNT OF THE DRONE BEE.

THE DRONES are a ſpecies of bees, well known to every Bee-maſter, and may eaſily be diſtinguiſhed from the common or working bees. They are both larger and longer in the body. Their heads are round, their eyes full, and their tongues ſhort. The form of the belly differs from thoſe of both Queen and common bees; and their colour is darker than either. They have no ſting, and they make a much greater noiſe when flying, than either the Queen or the common bees;—a peculiarity of itſelf ſufficient to diſtinguiſh them.

The drones are, by almoſt all writers reckoned the males, (See p. 62,) and are ſo ſtiled by moſt authors; but for my part I neither know what to call them, nor of what uſe they are; although I have often thought upon the ſubject, yet I cannot be ſatisfied with any theory I ever heard of. Various conjectures have been made with reſpect to their uſe. Although almoſt all agree that they are the males, and couple with the Queen; yet they acknowledge that they never ſaw an inſtance of any one of them in the act with her. It is ſurely wonderful, if the drones are the males, that they ſhould have eſcaped the prying eyes of philoſophers in all ages, whereas, almoſt every eye has detected ſmaller inſects in the act.

Swammerdam, ſenſible of this, to ſhelter himſelf, flies to that falſe refuge, that the *ſmell* of the drones anſwers the ſame end as copulation. Others ſay, that their heat is neceſſary for hatching the young bees. But this argument has no weight with me; as bee-hives have moſt part of their bees bred, and are well nigh ſwarming, before any number of drones appear in the hive. Beſides, by the time that they become numerous, ſo as their heat might do good in that reſpect, the heat is generally ſo great, that the bees have too much of it; and, therefore, often ly out in the fore part of their hive to get air. It is therefore plain, that they need not be at the expence of maintaining a parcel of idle gluttons, for the ſake of increaſing what would do them more harm than good.

That the Queen ſtands in no need of their aſſiſtance to fecundate or impregnate her, has already been obſerved, and appears plain, from this conſideration, that ſhe lays eggs, which produce young bees, without having had any previous communication with the drones. I will not, however, ſuppoſe that the drones are of no uſe in the hive; but that the Queen lays eggs which produce young bees, without ſo much as ſeeing a drone; I can with the utmoſt confidence affirm.

The advocates for the old doctrine, that the drones are males, alledge, that they impregnate the Queen, before their brethren kill them. According to this theory, ſhe ſhould continue for no leſs a period than ſeven or eight months, with about 12,000 impregnated eggs in her ovarium, which would certainly make her appear very large during the whole of that period. But it is unneceſſary to waſte arguments in refutation of this doctrine, as I have already ſhown (pages 56,57,58) that I have repeatedly had Queens breed and lay eggs, and thoſe eggs become bees, although theſe Queens were bred ſeven months after all the drones were dead, and ſome weeks before any new ones were hatched. Theſe experiments, I think, are ſufficient to ſilence all the arguments advanced by the advocates for the drone ſyſtem. Mr DEBRAW, indeed, creates *little drones*, and gives them power to live all the year, and to impregnate the Queen at pleaſure. But as room does not permit me to narrate the experiments whereby he attempts to prove this, I ſhall content myſelf with ſtating his ſentiments in as few words as poſſible. He aſſerts, that, beſides the common large drones, which every perſon, acquainted with bees, knows at firſt ſight, there is a ſmall kind of drones, which are, to all appearance, like the common bees, there being no viſible difference, except that they have no ſting, which he diſcovered by immerſion in water, and preſſure. After relating an experiment on this head, he ſays, " I once more " immerſed all the bees" (of a ſmall ſwarm) " in water, and when they appeared to be in " a ſenſeleſs ſtate, I gently preſſed every one of

" them between my fingers, in order to diſtin-
" guiſh thoſe armed with ſtings from thoſe
" that had none, which laſt I might ſuſpect to
" be males. Of theſe I found fifty ſeven,
" exactly of the ſize of common bees, yielding
" a little whitiſh liquor on being preſſed be-
" tween the fingers."

He farther alledges, that if there be only a Queen and bees that have ſtings in a hive, although the Queen lays eggs, yet if ſhe has no drones to inject the ſeminal matter upon them, the eggs will ſtill remain unproductive, and will decay, even although there were 1000 bees with ſtings in the hive. In anſwer to this, I ſhall here narrate an experiment I made ſeveral years ago.

On the firſt of Sept. 1788, I took all the bees out of a hive that was breeding very faſt, and in which I found only four drones, which I killed. I put the bees into a hive that had nothing in it but empty combs. After waiting ten days, upon looking between the combs, I found maggots newly ſealed up, in the cells. I then took out all the bees, and ſhook them into a tub full of water, from which immerſion I recovered them gradually, and while doing this, I preſſed each bee individually, to try if

I could diſcover any of thoſe ſtingleſs little drones; but not one appeared, all of them having ſtings, to the number af 3000. After this I ſearched the old hive I had taken them out of, and cut out all the combs that had eggs or young in them; among which I found ſome cells that had new laid eggs in them; others whoſe eggs were converted into a ſmall worm, and others ſome with maggots in them. I then reſtored the Queen, and all the bees, putting them into the ſame hive again, but without leaving a ſingle egg in it. During the ſucceding twenty days, I inſpected the hive, and found the bees, in fine weather, working with great alacrity, a ſure ſign that the Queen was breeding again. After this, on turning up the hive, and cutting out one of the brood combs, I found new laid eggs in ſome of them; others containing maggots; beſides ſome young bees, almoſt ready to emerge from their cells.

I made another experiment, about the ſame time, upon a hive that had ſome brood combs, but had not had a large drone for ſeveral weeks preceding. This hive did not contain above 500 bees, a circumſtance that was in my favour, as, being leſs numerous, the trouble was proportionally leſs. I carried the hive into a cloſe room in my houſe, that not a ſingle bee might eſcape me; but, after repeating the former experiment of immerſing them in water, recovering, and preſſing them one by one, I found that every one of them had a ſting.

I think theſe experiments may ſatisfy any unprejudiced perſon, that there is no ſuch creature in exiſtence as a ſmall drone bee; unleſs it be in Mr DEBRAW's *brain.* But, if Mr Debraw, who ſays he can find fifty-ſeven in a ſmall ſwarm of bees, will ſend me the odd ſeven, I will give him one of my beſt hives for them, and I think he will not ſay that they are ill ſold.

I have often had good hives, with few or no drones in them, during the whole year. Mr KEYS is wrong, when he ſays, a top ſwarm will not thrive without drones, for I am certain of the contrary. In ſummer 1785, I took off four ſwarms of my own in one day, without a ſingle drone in one of them; yet they all throve well, and the bees bred drones in them about four weeks thereafter.

Although I cannot determine of what uſe the drones are to a hive, unleſs it be to help to conſume the honey, which they are very well qualified to do, yet it is obſervable that the beſt hives produce them earlieſt in the year; as they generally appear in ſuch hives about the beginning of May, and the working bees put an end to their exiſtence at Lammas, at which period I generally aſſiſt them as much as I am able.

After my firſt work upon this ſubject appeared, I had the honour of a converſation with two very intelligent gentlemen in my neighbourhood, who declared their ſatisfaction with the arguments I had formerly advanced. I alſo repeated, in the preſence of one of them, ſome of the experiments I had made, to prove that the common bees are endued with the power of rearing any egg, from a common cell, to become a Queen, when the community ſtands in need of one; and that a Queen, although ſhe never ſaw a drone, will, at a proper age, lay eggs in abundance, which, again, by the aſſiſtance of the common bees, will produce Queens, commons, and drones, as well as thoſe eggs that are laid by Queens, who are ſurrounded with drones in the hives to which they belong.

After ſeeing theſe experiments, of which he expreſſed his approbation, I had another converſation with both theſe gentlemen, when they aſked me,—What then is the uſe of the "drone?"—In anſwer to this, I candidly acknowledged that I could not tell, as any conjecture, that I could form reſpecting their uſe, appeared to be attended with inſurmountable objections. We all agreed, however, that they certainly muſt be of ſome uſe, as Nature, or, more properly ſpeaking, the GOD of Nature, does nothing in vain.

One of the gentlemen ſaid, that, perhaps bees might be like ſome other inſects, whoſe males were not neceſſary in every act of generation, and that, perhaps, although a Queen bee, who had never ſeen a drone, could lay an egg which would produce a Queen, and that Queen again do the ſame, and thus the production of Queens and bees be continued with equal ſucceſs, for perhaps ſix, eight, or ten generations; yet it might perhaps turn out, that theſe Queens would gradually become more and more unfruitful, and at laſt grow altogether barren, unleſs they ſhould cohabit with the drones. The other gentleman, however, was of opinion, that if one Queen was fruitful without the agency of the drones, every other one would be ſo likewiſe, to the end of the world.

There is one thing, however, that ſeems to favour the former gentleman's conjecture; viz. that ſome hives, which had not a ſingle drone in them, have been known to breed well for one ſummer, pretty well the next, and even tolerably the third; but at laſt, have breed drones, and thereby turned out much more prolific thereafter: although it muſt be owned, that ſuch hives generally fail at laſt. Seeing the drones are great conſumers of honey, though they do nothing to provide any, ſhould the above conjecture, therefore, turn out to be true, a practical inference may naturally be drawn, that a hive may thrive fully as well, or rather better, for 3 or 4 years, without drones than with them; after which period, they might again be introduced into the hive, for the purpoſe of renewing the prolific powers of the Queen, and prevent the royal race from becoming barren or extinct. It may be farther obſerved, as an additional argument in favour of the above conjecture, that although the Queen and her daughter, none of whom ever ſaw a drone, might lay abundance of eggs, which would all produce bees; yet they might probably have laid a great many more, had the drones been in the hive with them.

I muſt confeſs, it appears ſomewhat paradoxical, to ſay that females will breed ſucceſsfully for ſeveral generations without the aſſiſtance of the males; and yet at laſt prove barren, and give over breeding altogether, till their prolific powers are renewed by freſh males cohabitating with them. But however paradoxical or unaccountable it may appear, that is not a ſufficient reaſon for us to reprobate the ſuppoſition; as there are many of the arcana of nature that are equally wonderful and unaccountable, and the elucidation of which has hitherto baffled the inveſtigation of the moſt penetrating geniuſes, and deepeſt enquirers into the ſecrets of natural philoſophy.

One of the above-mentioned gentlemen deſired me to try an experiment, and endeavour to aſcertain the fact, whether the want of drones will occaſion a gradual barreneſs to take place in a ſucceſſion of Queens. My anſwer was, that I had long entertained an idea of a plan, whereby I am perſuaded that I could dive into, and probably diſcover this ſecret of Nature; but that the execution would both require time, and be attended with a conſiderable degree of expence, by the loſs of many hives, which at preſent I do not find myſelf inclined to riſk. Whereupon he deſired me to make the experiment with his own hives, which I engaged to do the firſt leiſure opportunity: And as it may doubtleſs be a piece of uſeful natural philoſophy, I ſhall certainly communicate the reſult of my inquiries to the public on a future occaſion.

CHAP. IX.

ACCOUNT OF THE WORKING BEE.

THE WORKING, or COMMON BEES, are ſo often ſeen by every body, and ſo univerſally well known, that a particular deſcription may almoſt appear unneceſſary, although, for uniformity's ſake, I ſhall give it. They are ſmaller in ſize than either the Queen or the drone bees; and, the denomination they have ſo juſtly obtained, of *Working* Bees, plainly denotes their ſuperior induſtry, in labouring for the whole hive.

The common bee as well as the other two ſpecies of that valuable inſect, conſiſts of three parts, viz. the head, which is attached by a narrow kind of neck, to the reſt of the body;—the breaſt, or middle part;—and the belly, which is nearly ſeparated from the breaſt by an inſection or diviſion, and connected with it by another narrow neck or junction. There are two eyes in the head, of an oblong figure, black, tranſparent, and immovable. The mouth or jaws, like thoſe of ſome ſpecies of fiſh, open to the right and left, and ſerve inſtead of hands, to carry out of the hive whatever encumbers or offends them. In the mouth there is a long proboſcis, or trunk, with which the bees ſuck up the ſweets from the flowers. They have four wings faſtened to their middle part, by which they are not only enabled to fly with heavy loads, but alſo to make thoſe well known ſounds and hummings, to each other, that are ſuppoſed to be their only form of ſpeech. They have alſo ſix legs faſtened to their middle. The two foremoſt of theſe are the ſhorteſt, and with theſe they unload themſelves of their treaſures. The two in the middle are ſomewhat longer; and the two laſt are the longeſt of all. On the outſide of the middle joint of theſe laſt, there is a ſmall cavity in the form of a marrow ſpoon, in which the bees collect, by degrees, thoſe loads of wax they carry home to their hives. This hollow grove is peculiar to the working bee. Neither the Queen nor the drones have any reſemblance of it.

The belly is ornamented or diſtinguiſhed with ſix rings; and contains, beſides the inteſtines of the animal, the honey bladder, the venom bladder, and the ſting. The honey bladder is a reſervoir, into which is depoſited the honey that the bee ſips from the cups of the flowers, after it has paſſed through the proboſcis, and through the narrow pipes, that connect the head, breaſt and belly of the bee. This bladder, when full, is of the ſize of a ſmall pea, and is ſo tranſparent, that the colour of the honey can be diſtinguiſhed through it. The ſting is ſituated at the extremity of the belly, and the head or root of it is placed contiguous to the ſmall bladder that contains the venom. It is connected to the belly by certain ſmall muſcles, by means of which the bee can dart it out, and draw it in, with great force and quickneſs. In length it is about the 6th part of an inch. It is of a horny ſubſtance;

is biggeſt at the root, and tapers gradually towards the point, which is extremely ſmall and ſharp; and when examined by the microſcope, appears to be poliſhed exceedingly ſmooth.*. It is hollow within, like a tube, that the venomous liquor may paſs through it, when it ſtrikes any animal, which it does the very inſtant that the ſting pierces the ſkin, and inſinuates itſelf into the wound; which proves mortal to many ſmall animals, as well as to the bee herſelf, when ſhe leaves her ſting in the wound; as it draws after it the bladder, and ſometimes part of the entrails of the bee.

Theſe working bees may be ſaid to compoſe the whole community, except in the ſeaſon of the drones, which hardly laſts three months. During all the other nine months, there are no other bees in the hive, except them and the Queen. The whole labour of the hive is performed by them. They build the combs, collect the honey, bring it home, and ſtore it up in their waxen magazines. They rear up the eggs, to produce young Queens, common bees and drones; they carry out all incumbrances that are in the hives; they defend the community againſt enemies of every kind, and kill all the drones.

CHAP. X.

DIRECTIONS TO GUARD AGAINST THE STING OF A BEE, WITH THE METHOD OF CURE.

As we muſt now proceed to the handling of our induſtrious inſects, it is neceſſary to put our readers on their guard againſt their ſtings.

Unleſs they are hurt, provoked, or affronted, bees ſeldom make uſe of their ſtings; but they are ſo extremely irritable, that whoever wiſhes to be on a friendly footing with them muſt beware of giving them the ſmalleſt offence. They will hazard their lives, rather than let an affront paſs unrevenged; and, when exaſperated near their hives, one may as well take a lion by the beard, or a bear by the ſnout, and expect to come off unpuniſhed, as to hope to capitulate with them.

When a perſon has any thing to do about his bees, which, he thinks, may provoke their vengeance, and which, nevertheleſs, muſt be done, ſuch as making them ſwarm, uniting light hives, &c. then he muſt equip himſelf properly, by putting on his harneſs,* and keeping it on, as long as their rage continues. But when they are ſurpriſed or frightened by rapping on the hive, they will be very pacific, and will not attempt to ſting. After which, the Bee-maſter may ſafely throw off his harneſs, and even his coat, by which he will be more fit for performing buſineſs with them.

But ſhould they be greatly enraged, the beſt method, if there is a houſe or open door near, is to run as quickly as poſſible into it, and ſhut them out, (for it is eaſy to out-run them,) and thus prevent them from following. In ſuch a caſe they will fly about the door for ſome time in great rage, impatient for an opening to

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* The HARNESS, or SAFEGUARD, ſhould be formed on this plan. Let a net be knit with ſuch ſmall meſhes, that a bee cannot paſs through. Silk, gauze, catgut, crape, or any thing woven of a fine thread, will anſwer equally well. The ſafeguard muſt be made large enough to cover a man's hat, head, and neck, and to tie cloſe together before his breaſt with a ſtring. In tying it, great caution ſhould be obſerved, that not the ſmalleſt chink or opening be left for a bee to get in at; otherwiſe the remedy will prove worſe than the diſeaſe; as thoſe that get in would ſting with the utmoſt virulence, and it would be impoſſible to get either the ſtings or the bees quickly out from under the harneſs. The hands ſhould be covered with a pair of gloves, and the legs with a pair of coarſe ſtockings, or two pairs of fine ones, as the bees will often ſting the legs through one pair.

to get in; but the perſon muſt take care to remain cloſe priſoner, till his winged enemies retire. But if there be no houſe of refuge at hand, where he can retire by rapid flight, he ſhould by no means retire gradually, but rather ſtand ſtill like a ſtatue, or ly down flat upon the ground, without any motion, with his face downwards, in which caſe he may get off with only two or three ſtings; but if he attempts to fly and the bees overtake him, they will ſting him in ſo many parts at once, that he may not come off with leſs than one or two dozen of wounds.

After their fury is abated, and the remembrance of the affront entirely obliterated, the bee-maſter may then renew his acquaintance with his winged labourers; and if he comes in a humble manner, and walks gently and ſubmiſſively among them, they will treat him kindly. In every buſineſs one has to do with bees, he muſt do it in a calm, ſoft, gentle, and ſubmiſſive way; he muſt take care not to approach them in a raſh, haſty manner, puffing and blowing, or accompanied with any thing that has a diſagreeable or unſavoury ſmell, as their organs of ſmelling appear to be very acute. In a word, gentle reader, er, you muſt approach your bees, as you would appear before your patron, when you are going to aſk a favour of him; and not, as you would meet an opponent in a duel; unleſs you be armed cap-a-pee.

When the bees attack a perſon who is walking among them, let him put them gently aſide from his face with his hand, or thruſt his head into a buſh, and they will ſoon leave him.

When they are offended at any perſon, the chief parts they aim at are the face and hands, knowing theſe parts are moſt vulnerable. But if the face and hands are covered, they will ſurround him, and try to diſcover any aperture in his ſhirt, neck, breaſt, ſleeves, breeches-knees, &c. and if they find an opening at the ſmalleſt ſlit or crevice, they will puſh in at it, and leave their ſtings, with their venom behind, though they loſe their lives in the conflict.

The hair of the head, beard, and eye-brows, are all very offenſive to bees, and if they accidentally light on any of them, they will ſting that very inſtant. When at work in the field, they never offer to ſting, let them be ever ſo much affronted. One may then chaſe them from flower to flower, without provoking them to ſting: they rather, on ſuch occaſions, fly off from the intruder, as unworthy of their notice.

The ſtings of bees have very different effects on different perſons. There are ſome perſons, upon whom the ſting of a bee produces neither inflammation nor pain. Such people need uſe no precaution, even when they are ſure to receive many ſtings. Upon others, again, the ſting of a bee, occaſions ſuch exquiſite pain, accompanied with ſwelling and inflammation, that nothing can terrify them more than the ſight of a bee. This laſt claſs ſhould not be diſcouraged. I myſelf have felt very different effects from their ſtings at different times. The ſeldomer I am ſtung, and the longer interval that occurs ſince I was laſt wounded, the greater pain I feel, and the more I ſwell: but when I am ſtung twice or thrice in a day, I value it not a pin. I have ſometimes received forty ſtings in a day without ſwelling in the leaſt. The reaſon of this I preſume not to account for; I only mention the fact, leaving it to medical people, or thoſe who have ſtudied the nature of animal poiſons, to inveſtigate the cauſe.

Many remedies have been preſcribed, moſt of them to little purpoſe, to cure the wound received by a ſting. Oil of olives, or any mild oil, is thought by many to be effectual. Bruiſed parſley is recommended by others; the honey taken out of the bee that inflicted the wound, is preſcribed by a third claſs. Some ſay, that the ſweet ſpirit of vitriol, well rubbed into the wound, will prevent both the pain and the ſwelling. Repeated experiments, however, have ſhown that the eaſe, received from any of the above medicines, is not always to be depended upon, and therefore may be imputed as much to accidental circumſtances, ſuch as the wounded perſon's ſtate of health, blood, &c. as to any peculiar ſpecific virtue; although I doubt not, but that any or all of them may ſometimes afford relief.

The ſting and its poiſon are injected in a moment, and the pain and ſwelling inſtantly ſucceed, when ſuch remedies are often very diſtant. My remedies are more ſimple, and one or other of them is always at hand. The moment I am wounded, after pulling out the ſting, I take a blade of kail, dock, aſh, or almoſt any green leaf of any plant or ſhrub neareſt me, and, bruiſing it a little, rub the juice into the wound. When near water, I waſh the wound, or apply a wet cloth, which I have ſometimes found give relief. But, indeed, I do not, once in a dozen of inſtances, apply any remedy at all, except pulling out the ſting, as it ſeldom makes me uneaſy; and I know a ſhort time and a little patience will afford an infallible cure.

CHAP. XI.

HOW TO CHOOSE STOCK HIVES IN SEPTEMBER.

ANY perſon, who intends to erect an apiary, muſt take particular care to have it filled with proper inhabitants. He muſt be peculiarly attentive to this, as all his future profit and pleaſure, or loſs and vexation, will, in general, depend upon it. He muſt therefore pay the utmoſt attention to the choice of his ſtock hives; for the man who takes care to keep good ſtock hives will ſoon gain conſiderably by them; but he who keeps bad ones, will, beſides

ſides a great deal of trouble; and little or no ſucceſs, ſoon become a broken Bee-maſter.

In September every ſtock hive ought to contain as much honey, as will ſupply the bees with food, till June following; and as many bees as will preſerve heat in the hive, and thereby reſiſt the ſeverity of a cold winter, and act as ſo many valiant ſoldiers, to defend the community from the invaſions of foreign enemies in ſpring. And, as September may be ſaid to be the bee-maſter's ſeed time, as well as his harveſt, we ſhall begin with it, and go round the circle of the year, giving ſuch directions as are neceſſary to be obſerved in the different ſeaſons, till we arrive again at the ſame period. Therefore the bee-maſter ſhould purchaſe a proper number of hives in Auguſt, or September, when they are at the cheapeſt rate. They ſhould be full of combs, and well ſtored with bees and honey; and ſhould weigh at leaſt 30lb. each; if heavier, ſo much the better; for light hives run a great riſk of periſhing by famine, unleſs the bees are ſupplied with food; which will coſt as much expence, and a great deal more trouble, * beſides a conſiderable

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* However, when a ſufficient number of good ſingle hives for

ſiderable riſk of their dying at laſt, after all this extraordinary trouble and expence. Whereas, a well choſen hive of 30lb. weight, allowing 12lb. for the empty hive, bees, combs, &c. will contain 18lb. of honey, which will ſupply the bees with food till next June; a time, when, it may be preſumed, they will find abundance of proviſions for themſelves among the flowers.

When a choice can be obtained, the youngeſt hives ſhould always be preferred, becauſe old hives are liable to vermin, and other accidents. But although a hive ſhould be four or five years old, it ſhould not be rejected, if it poſſeſſes theſe two eſſential qualities, plenty of bees, and abundance of honey; but, if either

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for ſtock cannot be obtained, they may be made up, by conjoining the bees and honey of two or three light hives into one, and thereby making one tolerably good hive out of ſeveral bad ones. The method of doing this ſhall be noticed afterwards; but it is a meaſure that ought never to be adopted but in caſes of neceſſity. For neither ſuch conjunctions of light hives, nor feeding of bees ought to be adopted, at this ſeaſon, on purpoſe to make them ſtand the winter's cold, if they can poſſibly be avoided. Indeed, ſometimes very light hives, with few bees in them, will ſtand through the courſe of a mild winter, and do well the following ſummer; but ſuch hives are at beſt precarious, and therefore not to be depended upon.

either of theſe be a-wanting, the purchaſer will regret his bad bargain when it is too late.

CHAP. XII.

OF THE REMOVING OF BEE-HIVES.

IN the removal of hives, the diſtance, to which they are to be removed, muſt be chiefly conſidered. If it is ſmall, they may be tranſported in a hand barrow, carried by two men;—or they may be carried on a man's or woman's head, in the manner that a milk-maid carries her pails.

To prevent the bees from coming out during the carriage, a little ſtraw or graſs may be put into the mouth of the hives. But, in warm weather, the greateſt care muſt be taken, not to ſuffocate them with too much heat; eſpecially if there is a great number of bees in the hive. For this purpoſe, they muſt not be ſo cloſely ſhut up, as not to admit abundance of freſh air. For, the great heat of the bees, when no air is admitted, will melt the combs and the honey, and ſuffocate or drown the bees. In this manner, valuable hives have often been loſt in the ſummer ſeaſon, by ignorant perſons, who had been employed to tranſport them, ſhutting up the door of the hive ſo cloſe, that no air could get in. The proper method to prevent the bees from coming out of the hive, in caſe of removal, in warm weather, or indeed at any time, and at the ſame time to admit a circulation of air, is, to get a piece of lead or tin plate, pierced full of ſmall holes, and fixed to the entry of the hive. This will anſwer both purpoſes, by admitting freſh air, and at the ſame time preventing the bees from flying away.

When the diſtance is great, and there is a conſiderable number of hives to be tranſported, (perhaps to the diſtance of 6, 12, 20 or 50, miles) into an in-land country, carriages that move on ſprings are by all means to be preferred. When theſe cannot be obtained, the hives may eaſily be carried on carts or waggons, in cold weather, by placing them with their bottoms upmoſt on large quantities of ſtraw, hay, or any other ſoft article. By this method I have carried 20 hives at one time, with very little damage, either to the bees or the combs. Great care muſt be taken in placing them in the cart or waggon, that one hive may not interrupt or intercept the current of air from another. In hot ſultry weather, the removal ſhould be made in the night.

Before placing the hives in the carriages, every one of them ſhould be lifted off the ſtool it uſually ſtands on, and placed upon a piece of cloth about three feet ſquare. This cloth ſhould be of the ſame texture, with thoſe kinds of which window blinds, or cheeſe-cloths are made, that it may admit air, at the ſame time, that it effectually prevents the bees from eſcaping out of the hives. Let it be drawn cloſe up, around the edges of the hive, and, when properly ſecured to it with pack-thread, not a ſingle bee will get out. All this ſhould be done the evening before they are removed.

The utmoſt care ſhould alſo be taken, that no other opening be left at any other part of the hive, for the bees to get out at, as the moſt dangerous conſequences might ariſe, as the jolting of the vehicle might provoke the bees to ſting both the driver and the horſes; which might occaſion the overturning of the carriage, and of courſe not only riſk the deſtruction of the whole cargo, with the carriage and horſes, but even the life of the driver himſelf.

Another method, if the diſtance is great, I would recommend as preferable to every other, where it can be obtained, viz. carriage on ſhip-board, either by ſea, canals, lakes, or navigable rivers. By this mode of conveyance, the bees run no riſk of being jolted or hurt in the leaſt, provided they are properly ſtowed in the veſſel. This laſt winter, (1794,—5,) I carried twenty hives on ſhip-board, with great ſafety, to a gentleman about 300 miles diſtant. I would, therefore, earneſtly recommend water carriage wherever it is practicable, as preferable to every other mode of conveyance whatever; for I would rather carry a number of bee-hives 4000 miles by ſea, than 100 miles by land carriage.

CHAP. XIII.

HOW TO PREPARE STOCK HIVES FOR WINTER.

AFTER the hives are brought home, if room will permit, let every hive be placed two or three yards aſunder, that the bees of one hive may not interfere with thoſe of another, as is ſometimes the caſe, when the hives are ſeated near one another, or upon the ſame ſtandard; for the bees, miſtaking their own hives, alight ſometimes at the wrong door, and a battle enſues, wherein one or more may loſe their lives. There ſhould not be too many hives in one place. Eight or nine are ſufficient for one garden*; and as many more may be placed at about half a mile's diſtance in every direction; and thus the whole kingdom, or even the whole iſland, might be covered with bee-hives, at proper regular diſtances, wherever there is a ſufficiency of food for the bees to work on.

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* When too many hives are placed in one apiary, they are often troubleſome in ſwarming time, by the ſwarms going together, and by robbing one another, which they often do in Spring and Autumn, as will be ſhown afterwards. Beſides, when one has to feed them, the ſmell of the honey entices them to ſteal from each other, which ſometimes occaſions many battles, whereby many of the bees are killed. But when there are not

The hives ſhould be placed on boards or ſtools, made of well ſeaſoned wood. Theſe boards ſhould be made a little broader than the bottom of the hives, and ſhould project about ſix inches before the entry to it, that the bees may have a ſufficient breadth to alight upon, when they return from the fields. When a proper place is fixed on, where the hive is to be erected, let three ſtakes be driven into the ground, till the tops of them are within ten inches of it, and the foremoſt ſtake one inch lower than the other two. The ſtool with the hive on it may then be placed upon theſe; and at ſun-ſet, let the ſkirts of the hive be plaſtered all cloſe to the board with plaſter lime. Next, let two ſmall holes be cut, in the under ſide of a ſmall piece of hard wood, which muſt be fixed to the entry of the hive with lime. Theſe holes muſt juſt be

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not too many hives in one place, they are not under ſo much temptation to enter into ſuch conflicts. But at the ſame time, twenty or thirty may be placed in one large apiary, and all do very well, although the other method is rather to be preferred.

be wide enough to admit the largeſt bee, but no wider, leſt the mice ſhould go into the hive through them †. Each hole ſhould ſcarce exceed a quarter of an inch in heighth and in wideneſs. This ſize muſt be exactly attended to. The whole hive ſhould then be covered all over with a large quantity of pob tow, or ſtraw, which may be fixed to the hive with ropes made of ſtraw, or hay. A large *divot*, or turf, ſhould be laid upon the top of the tow or ſtraw, to hold it cloſe down to the hive, and keep the bees dry and warm. Afterwards, ſome of the

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† Mice are moſt pernicious enemies to bees; for when they get into a hive, they not only eat the honey, but the combs and eggs, and even the bees themſelves. I am perſuaded there are hundreds of hives deſtroyed every year in Britain by theſe vermin. I myſelf, in my younger years, had no fewer than five hives ruined in one winter by theſe rapacious invaders : but now, by taking care to have the entries to my hives made no larger than will juſt admit the largeſt bee, my hives are proof againſt their depredations, and I never loſe either a ſingle bee or a particle of honey by them. The only chance the mice have, when this precaution is obſerved, is to gnaw through the hive itſelf, which they will ſometimes attempt; but in this they may eaſily be detected and defeated, by taking off the covering now and then.

During the cold months, ſmall ſnails often creep into the hives, and lurk about the inſides of them, though not among the combs : but I never obſerved that they did much hurt. When the hives are turned up in winter to diſcover their ſtate, it is eaſy to diſlodge them, and large ſnails cannot get into the hives, when the entries are made ſmall.

tow or ſtraw, ſhould be rolled up about four inches above the entry, which will permit the bees to get in thereat; for the leſs that is uncovered of the hive, the drier and warmer it will be, which ſhould be aimed at in all ſeaſons, eſpecially in winter.

The beſt of all covers for hives, however, that I have yet ſeen or heard of, are ſuch as I ordered a potter to make for me of burnt earthen ware. They are made in the form of a hive, pretty ſtrong, about 21 inches wide, and 12 deep; with a circular edging turned up at the ſkirts, and a ſpout about an inch in length. Theſe, being placed above the pob tow, or ſtraw, keep it cloſe to the hive, and may eaſily be taken off or put on at pleaſure. The ſpout being placed behind, all the water runs off at the back of the hive. The hives, when thus covered, may be compared to a man's head with a wig and hat upon it; the pob tow reſembling the wig, and the earthen cover the hat. The only objection to theſe covers is, that they are brittle, and eaſily broken; but the care, that every good bee-maſter will readily beſtow upon his hives in any caſe, is ſufficient to preſerve them from accidents of this kind. I ſold above 30 of theſe covers to a gentleman in Northumberland about three years ago, and I have reaſon to believe that there is not one of them yet broken.

CHAP. XIV.

HOW TO MANAGE BEES IN WINTER.

THE hives in September, being properly placed, covered, and made fit to endure the winter, there is very little more neceſſary to be done, for about three months. This ſeaſon may, therefore, be called *the Bee-maſter's reſting time.* It will be proper, however, occaſionally to take care, that the covers continue to ſtand firmly upon the hives, and that no mice neſtle about them. When the froſt is ſevere, or when ſnow is lying on the ground, it will be neceſſary to prevent the bees from coming out of the hives, by ſhutting up their entry quite cloſe with pob-tow; which will keep them warm, at the ſame time that they will run no riſk of ſuffocation in very cold weather.* In extreme colds, the hives may be taken into out-houſes, which will preſerve

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* Bees ſhould by no means be diſturbed in cold weather, ſo as to provoke them to go abroad out of their hives, unleſs ſome very important object is in view: For, not only in winter, but even in ſpring, ſummer and autumn, if they fly out of their hives in cold or wet days, eſpecially in the evenings or mornings, and alight on the ground, their active powers become inſtantly ſo benumbed, that often within half a minute thereafter, they will be rendered totally unable to riſe, in conſequence of which they muſt crawl about till they periſh. If bees are permitted to go abroad in time of ſnow, which they are tempted to do, by the glare of the light, they will alight upon it, and ſip a little; but their delicate bodies are ſoon ſo chilled by the cold, that their wings loſe their power of raiſing them, and inevitable death ſucceeds.

Every other part of the hive, as well as the entry, ſhould be carefully examined, to diſcover if it be all quite cloſe; for after long confinement, eſpecially when the ſeaſon is advanced to about the middle of February, the bees will make every poſſible attempt to get out of the hive, as their own ordure then becomes offenſive to them. At times, when I have thought the entry to the hive was made ſo completely ſecure, that not a ſingle bee could get out at any opening. yet, in walking through my apiary, I have diſcovered them making their way through places, where I could not have ſuppoſed they would have attempted an eſcape. When bees are completely ſhut up in a good cloſe hive, they are in a ſtate of perfect darkneſs; but, if there be the ſmalleſt aperture in any part of it, the light, ſhining through it, leads them directly to the place; when they are apt to make every poſſible effort to widen it, and, in ſuch caſes, they will often ſqueeze through ſerve them from cold. But, indeed, when the hives are properly covered, and the entries to them cloſely ſhut up, they will reſiſt a very ſevere cold.

Many ingenious gentlemen have tried different methods to preſerve bees in winter. Some have ſhut them up in cold out-houſes, from September to April; others only from the 1ſt of November to March. A third claſs place grates before their entries, to admit air, but keep the bees cloſe in their hives, during the whole winter.

The limits of this performance will not permit me to enlarge upon the fruitleſſneſs of theſe inventions. Suffice it therefore to obſerve

through a very narrow hole. It is therefore adviſeable, though the hives may be ſuppoſed perfectly cloſe, to inſpect them frequently, leſt any bees ſhould get out at an unſuſpected place, and not only periſh themſelves, but leave an opening for invaders to get in. Beſides, upon returning to their hives, they will go to their uſual entry to get in again, and not finding admittance, will wander about in ſearch of it, till they periſh, unleſs they chance to alight upon the aperture by which they had got out. The ſame caution muſt be obſerved, when a hive is ſhut up at any other ſeaſon of the year, or upon any account whatever.

I have ſometimes picked up great numbers of wandering bees from off the cold ground, or ſnow, and, after recovering them by gradual warmth, have reſtored them again to their hives.

ſerve in general, that long confinement is prejudicial to the health of the bees; and that, as they do eat a little during their confinement, it is neceſſary that they ſhould get out to void their ordure; for, I have even ſeen bees, in ſome hives that have been long confined, ſwelled to ſuch a ſize, for want of ſuch opportunities, that they ſeemed larger than a Queen bee; and, when they did at laſt get liberty to go out of their hives, being unable to fly, they would fall over the edge of their ſtool, and creep about on the ground, till they died in great numbers; ſo that ſcarce one of a dozen of them ever recovered. But when they are permitted to go out occaſionally, in fine winter days, they get ſo much benefit by the free air, and by eaſing their bodies in flying, that, when they return to their hives, they are able to turn out the dead bees, and they conclude the day with a *ſong*;—a ſure ſign that they are healthy and happy. In ſhort, I find by experience, that bees thrive beſt, when the hives are allowed to ſtand out, and when the bees are at liberty to go out and in at pleaſure in fine days, even in winter; for they are wiſe enough to know when they may venture out with ſafety; and they will come to the door of their hive to eaſe nature, and return again, when the weather forbids their going abroad.

It is ſaid by many writers on this ſubject, that a fine winter is dangerous to the bees, and that many more of them die in a mild winter than in a cold one. They argue, that as the appetite of the bees increaſes by their going often out, they conſume their proviſions, and die of famine; whereas, when long confined in their hives, they hardly eat any. * I acknowledge

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* Some Authors, particularly MR STEPHEN WHITE, alledge, that ſevere cold is rather ſalutary for bees, as it keeps them in a torpid ſtate, in conſequence of which they eat none at all. I acknowlege, that they eat much leſs in cold weather than in warm, becauſe they have little or no exerciſe, and their appetite increaſes or decreaſes in proportion to the exerciſe they take. In November, December, and January, bees eat very little food, as any perſon may be convinced, by weighing their hives in the begining and the end of theſe months, when he will find very little difference in point of weight. But if he will weigh a hive in the beginning of March, and weigh it again at the end of it, he will find a conſiderable decreaſe; for the bees, having now much exerciſe, eat more honey during that month, than during all the three above mentioned cold months; and I am perſuaded, that they devour three times as much in May as in March, owing to the ſame cauſe operating in an increaſing proportion. But that the bees eat *none at all* in cold weather is a great miſtake, and may eaſily be refuted: For let any perſon, in winter, put a number of bees into a hive that has nothing but empty combs, and

knowledge, that, in a mild winter, they do eat more food than in a cold one, when they cannot get out; but this, as well as the fine air, contributes greatly to their health; beſides that they hatch earlier, and conſequently increaſe the number of bees in the hives ſooner. The fact is, that experience, which is preferable to the conjectural reaſoning of the moſt eminent authors, may convince any perſon, that many more bees die in ſevere winters than in mild ones. In winter 1776 which was very cold, a great number of Bee-hives periſhed; and alſo during laſt winter, (1794-5) being an exceſſively

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and let them be kept equally cold with thoſe in hives that contain both honey and bees, and a trial of eight or ten days will convince him, that *honey*, and not *cold*, is the proper food of bees.

In the very midſt of a ſevere froſt, I have often ſeen my hives with young broods in them; a ſure ſign, that they were neither motionleſs, nor in a ſtate of inactivity. This fact alſo proves how greatly miſtaken many authors are, who aſſert, that bees do not breed, till they begin to carry home loads in ſpring. I am confident, that there is not a month in the whole year, in which I have not ſeen many of my hives, with ſome eggs as well as young bees in the cells; although there are at leaſt four months in the year in which the bees carry home no loads. I will allow, however, that although they do breed ſome in winter, the number is very ſmall. Perhaps the Queen does not lay above three or four eggs in a day, whereas in ſummer ſhe will lay daily above a hundred.

ly ſevere one, many hives were deſtroyed from that cauſe alone; whereas in winter 1779, which was remarkably mild, not one hive in twenty failed; and the bees, in general, ſwarmed a month earlier than uſual.*

I have ſeen the bees of a hive that had been long confined by cold, (perhaps for ten weeks,) ſo

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* Mr Wildman ſays, page 249, " The degree of cold, which " bees can endure has not been aſcertained. We find that they " live in the cold parts of Ruſſia, and often in hollow-trees, " without any care being taken of them." Page 252, he ſays, " that bees ſuffer ſuch degrees of cold, as we here are ſtrangers " to, without detriment, ſeems certain; nor is it eaſily accounted " for, why a much leſs degree of cold becomes fatal to them " in our mild climate. If I may venture my opinion, I think " that in theſe extreme colds, the bees are ſo perfectly frozen, " that their juices cannot corrupt or putrify but they remain in the " ſame ſtate till the return of ſpring; when the change of the " weather being ſudden, the bees ſoon come to life; whereas in " our climate they are ſo far chilled as to loſe the ſigns of life, " and their juices being ſtill in a liquid ſtate, ſoon putrify, and " real death enſues with corruption."

With all due deference, I ſhall now venture to give my opinion, on this point. I would account for it in this manner; that the ſame *degree* of cold will prove equally fatal to bees in Britain, Russia, Siberia, or any other place in the world; and that whenever the cold is ſo great, as to render the bees entirely *motionleſs*, they will continue in that ſtate for ever; or, in other words, they will *die*; unleſs they be recovered by heat, before ſo diſeaſed, that, when good weather returned, and they came abroad, very great numbers would have died within a day or two thereafter; and the hive in general would have been greatly reduced. It is evident, that their long

confinement

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before putrifaction takes place, which will otherwiſe happen within two days at moſt, after they are frozen. Laſt winter (1794-5) it was perhaps as cold here, at leaſt for one week during the ſtorm, as it is in Ruſſia or Siberia, in ſome moderate winters. Some of our bees were, at that period, as completely and irrecoverably frozen, during thoſe eight days, as ever any hive could be in Ruſſia; and all the heat that human power could apply, however gradual or moderate, could not have recovered them to life again.

As a proof of this, any perſon may make the following experiment: Take a bee, during a hard froſt, and lay it upon a ſtone; within two minutes it will be frozen, and to all appearance dead. If it ly on the ſtone, for ſix or eight hours, it will be as completely frozen, as if it had been eight days in the coldeſt place in the world. Yet, by warming it in a warm bed, for half an hour, it may be brought to life again; whereas, if it be allowed to ly for eight days upon the ſame ſtone, (during which time it would be as completely frozen, as if it had been eight days in Ruſſia) neither the heat of a bed, nor any other degree of heat whatever, will ever be able to recover it. On the whole, I am of opinion, that all poſſible care ſhould be taken to preſerve bees from ſevere cold in every corner of the world; and I doubt much, if ever there was a ſingle hive, that was once completely frozen for twenty days, that, even in Ruſſia itſelf, or any other part of the globe, was ever recovered to life again.

confinement was the cauſe; but it is alſo certain, that, even in thoſe cold countries, where the winter laſts eight months, bees thrive and proſper well, elſe they never could produce ſo much honey*. I have known bees do well, however, that had been confined in their hives for five months, even in this country; while others of them were ready to periſh, by retaining their fœces for ſo long a period. Sometimes, about Martinmas, I have ſeen four hives, ſtanding in one place, all equally thriving and numerous; but, in conſequence of having been confined by bad weather for ſix or eight weeks after that period, one of theſe hives would have had ſeveral hundreds of dead bees, lying ſwoln on the ſtool, while the other three were ſtill in a thriving condition, and had ſcarcely a dozen dead bees in each. Upon tearing one of the dead bees aſunder, I found her inteſtines quite full of fœces; which, I therefore conjectured, was the cauſe of her death; whereas the inteſtines of the thriving bees had very little matter in them, and therefore, I am inclined to think that this was the reaſon of their continuing healthy and active. Whether the original diſeaſe of the former claſs, and their premature deaths, proceeded from their gluttony, in gormandizing more food than was neceſſary; or whether it was an epidemical diſeaſe that had got in among them, and carried them off in ſuch numbers, I will not preſume to determine; though I rather incline to the former opinion. But, from whatever cauſe the diſeaſe proceeds, ſuch hives often loſe their inhabitants at the rate of a dozen or more *per* day, till they are greatly reduced, or perhaps quite deſolated at laſt.

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* The reaſon may be acounted for in this manner; ſuppoſe, for inſtance, that one fourth part of the bees in thoſe places ſhould fail by long confinement or ſevere colds, (from which I ſuppoſe the natives will guard their bees as much as poſſible,) yet the remaining three parts will increaſe greatly in bees and honey during their ſummer, as the weather is very conſtant and warm while the honey ſeaſon laſts.

For ſuch misfortunes, I know of no remedy or even preventative; but it is fortunate, that ſcarcely one or two hives of a dozen meet with them. Sometimes I have united the living bees, that remained of ſuch a hive, with thoſe of a healthy one, but ſeldom found it turn out well; owing perhaps to this cauſe, that the diſeaſe was really contagious, and the diſeaſed bees might carry the infection along with them, and thereby hurt the healthy hive. I generally, therefore, let the remaining bees of ſuch an unfortunate hive, take their chance; and on the firſt favourable day allow them to fly about, and diſcharge their burdens, which muſt doubtleſs enable them to return to the hive with a greater degree of health; but I am confident that many of the diſeaſed ones never return, and indeed the hive will be fully as well without them.

About the middle of January, every hive may be gently lifted off the ſtool, and the ſtate of it examined. The ſtool ſhould then be carefully cleanſed of dead bees, or any filth that may have gathered upon it during the winter. The hive ſhould then be replaced upon the ſtool, and carefully plaſtered about the ſkirts again, and covered over as formerly. If the bees of any hive have deſerted it, and gone into another, which they ſometimes do, (as ſhall be further noticed in a ſubſequent chapter,) the hive may be carefully kept, in order to feed bees with the honey it contains in ſpring, or to receive a young ſwarm in ſummer.

CHAP. XV.

DIRECTIONS HOW TO SUPLY BEES WITH FOOD.

As bees ſometimes run ſhort of proviſions, eſpecially when there is a long continuance of cold or wet weather, during Spring, or even in the beginning of Summer, it is abſolutely neceſſary to re-inforce the hives, eſpecially the light ones, with additional ſtore. There are four methods of ſupplying the hives in ſuch caſes, which I ſhall lay before the reader, and one or other of which, every bee-maſter ſhould attend to, at ſuch ſeaſons of the year as he finds his bees will need a re-inforcement of proviſion.

I. The firſt, and indeed the beſt method is by *eeking**. Take an eek,* of ſix or eight rows deep, and place it on a ſtool, with the quantity ty of honey, neceſſary to ſupply the deficient hive, within it, which may be from one to four, or even eight pounds of honey, according to the deficiency that appears, and the number of bees in the hive. The combs ſhould be placed in the eek, in ſuch a poſition, that the bees may have free acceſs to the honey, on all ſides. At night, let the deficient hive be gently placed upon the eek, and let the interſtices between the hive and the eek be plaſtered up with lime; after which let the entry be ſhut, that neither native bees nor ſtrangers may get acceſs. Let the hive and the eek continue in this ſituation for 24 hours; in which time the bees will have removed all the looſe particles of the honey, and the ſmell of it will not be ſo apt to invite ſtrange bees. The entry at the bottom of the eek may, therefore, now be opened, and the bees allowed free egreſs and acceſs. If the additional quantity of honey given in the eek did not exceed a pound or two, the eek may be removed within three or four days; but if it amounted to ſix or eight pounds, it may be allowed to remain for ſix weeks in Spring. ‡ If, in September, a hive has

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** To *eek*, in the Scotch dialect, ſignifies literally to *add* to any thing. The *eek*, or *addition* here meant, is a part of an old hive, cut down on purpoſe, to give room for placing the ſupply of proviſion under the deficient hive.

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* This method may be practiſed at all ſeaſons of the year, and

has got an additional ſupply of twelve or ſixteen pounds, it ſhould be allowed to remain at leaſt as many weeks, if not altogether; only at this ſeaſon, place all the combs in the eek, in the ſame order in which they were naturally in the hive they were taken from;—the uppermoſt cells to be ſtill upermoſt, and ſo of the reſt, leaving a ſpace of an inch and a half between the combs. The combs muſt be fixed with ſticks to make them ſtand on their edges, and they ſhould run as much in the ſame direction as poſſible, with thoſe in the hive. The bees will ſoon join the combs together, and render them fit to be lifted all at once. In Spring, if the original hive be large, the eek and combs may be removed, but if ſmall, they ſhould both remain during Summer.

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and it has this additional advantage, that it may be executed at little expence, and occaſion a ſaving of all the honey in the old combs that will not run out, or that happens to be mixed with bee-bread, eggs, or young bees. All ſuch honey ought to be thrown into theſe *granaries*, and the bees will ſoon carry up all the honey, and place it in their own reſervoirs, leaving only the empty combs, which can be melted and made into wax afterwards. It need hardly be added, that the bees do not, in ſuch caſes, inſtantly eat all the additional honey that is given them, but only lay it up for future uſe.

II. The ſecond method is the ſame with the preceding, but differs only in this particular; that when the Bee-maſter has no old combs with honey in them, he muſt melt freſh honey, and pour it into large empty combs, of which drone combs are the beſt, and place them into the eek as above directed.

III. The third method is, to ſave the trouble of eeking the hive, (when a ſmall quantity may ſerve,) by placing a comb, with melted honey in it, upon the ſtool, immediately before the entry of the deficient hive, and leaving it entirely to the induſtry of the bees, to collect and carry it into the hive. The only diſadvantage of this method is, that ſtrange bees will be tempted to moleſt the natives, in conſequence of which a battle may enſue, and ſome lives may be loſt. But, to prevent this, let the honey be given at a time of the day when no bees are abroad, and the danger will be avoided. I have ſometimes had a dozen of hives in one apiary, with a feeding comb placed before each; which gave all the bees of each hive ſo much employment at their own doors, that they had neither time nor inclination to moleſt or rob their neighbours.

IV. The fourth method is, to turn up the deficient hive, and, laying it on one ſide, to pour melted honey into the empty cells, where there are few or no bees; and, when the one ſide of all the combs are properly filled, to turn up the other, and fill their empty cells with honey alſo. A tea-pot is moſt proper for executing this plan. In this manner I have ſometimes poured two pounds of honey into a hive at a time. When the hive is again placed on the ſtool, a little honey will run down from the combs upon it; but the entry being cloſe ſhut up, will prevent robbers from ſmelling the treaſure, and will keep ſuch bees, as may have been beſmeared with honey during the operation, within the hive. The native bees will ſoon not only lick up all the ſpilt honey from the ſtool, but will alſo ſuck it off the backs of their beſmeared brethren, and lay it up in their reſervoirs, with ſo much expedition, that next day not a drop of it will be viſible, either on the ſtool or on the bodies of the bees.

It is not to be doubted, that, in caſes of neceſſity, bees may be fed and preſerved with other articles, beſides honey; ſuch as ſugar, ſweet wort, treacle and the like: but I am of opinion, that they cannot be fed, either at leſs expence or with as much ſafety, with any other thing than their own natural food. To give them any other ſubſtitute, would occaſion as much expence, and a great deal of more trouble, eſpecially when the hives are well filled with inhabitants: and I dare venture to ſay, that as ſuch methods have never yet been much adopted, ſo, if ever they ſhould, they will not turn out to the proprietors advantage, or become of general uſe, in the preſervation of bees. But it muſt be owned, that, if no honey can be obtained to feed bees with, in ſpring, ſome of the above ſubſtitutes will ſupply the deficiency tolerably well. In ſuch a caſe, let 1 lb. of brown ſugar be mixed with half a gill, (or half a quartern) of ſmall beer, and let a table ſpoonful at a time be placed before the entry to the hive, as above recommended in the third method. Let this be repeated daily as long as is neceſſary, and the hive will be preſerved from famine, and will in all probability do well; but when a hive is light in September, it ought to be ſupplied with nothing but honey.

CHAP. XVI.

OF THE WARS AND ROBBERIES THAT TAKE PLACE AMONG THE BEES.

It cannot be denied, that the animals, who are the ſubject of this treatiſe, have their *vices*, as well as their *virtues*. To the virtues of *induſtry* and *oeconomy*, which they are endued with in an eminent degree, we muſt add, what ſome would call a *martial ſpirit*, but which rather deſerves to be denominated, a ſpirit of *theiving* and *robbery*. For when the weather is good, and there are not flowers in the fields for the bees to work on, they will riſk their lives by robbing other hives, and ſtrive to enrich their own hive at the expence and ruin of their neighbours. In ſuch caſes, the hives that are thinly inhabited, are ready to fall a prey to the bold invaders; for hardly one hive within their reach is left unaſſaulted; and as, among mankind, the ſtrong overpower and ſubjugate the weak, ſo a weak hive ſometimes falls a prey to a ſet of ſtrong invaders; but when ſtrong and *populous* hives (ſo to ſpeak,) are attacked by a leſs numerous body of robbers, they give them a terrible reception, and hardly a ſingle bee, that they can get hold of, gets off to tell his neighbours the fate of his brethren. Sometimes a good number of hives will join in robbing one ſingle hive. In ſuch a caſe, all is confuſion and rage, and great ſlaughter takes place. The bees are ſeen flying in the air like ſo many fiery dragons ready to attack every one; and whoever dares obſtruct their flight, will feel their poiſonous ſpears in a moment. At ſuch a time, one dare ſcarcely venture near them, unleſs he is reſolved to receive wounds from all quarters. When they are engaged thus, their ſound in the air is eaſily diſtinguiſhed.

The people's actions will their thoughts declare,
All their hearts tremble, and beat thick for war.
Hoarſe broken ſounds, like trumpets harſh alarms,
Run through the hive, and call them forth to arms:
All in a hurry ſpread their ſhiv'ring wings,
And fit their claws, and point their angry ſtings:
In crouds before the hive they all do light,
And boldly challenge out the foe to fight.

VIRGIL.

rain, or night coming on, or perhaps a dark cloud intercepting the ſun's rays, oblige the invaders to retreat. Next morning, if the weather be good, let the hive be ſhut up cloſe, to prevent the robbers from getting acceſs; and let it continue ſo for ſome time, till the invaders give over their attempt; but if they continue their inroads daily, let the hive be removed to the diſtance of a mile or ſo; and indeed this is the moſt effectual method to free the hive from farther moleſtation.

In my younger years, theſe robberies gave me much uneaſineſs, as I was alarmed at the ſight of a ſlaughtered bee; but now I give myſelf no concern, as I either put the bees of the hive that is attacked into another hive, or remove them to a proper diſtance from danger. I have frequently, indeed, ſeen ſome ſore battle take place among my own bees, and laſt for perhaps a day or two; after which a peace would have enſued, without my interference. But good hives ſeldom ſuffer much by robberies; perhaps not one in fifty. They may indeed loſe a ſcore of bees or ſo, but that will never hurt them.

CHAP. XVII.

DIRECTIONS HOW TO MANAGE BEES IN MARCH, APRIL, AND MAY.

In ſpring, hives are ſometimes found without a ſingle bee in them, and the owner, in ſuch caſes, is at a loſs to account for the cauſe. The following circumſtance, which occurred among my own bees, will throw ſome light on this ſubject.

The long continuance of the late ſtorm (1794-5) having confined the bees in their hives for about four months, the bees of ſome hives contracted diſeaſes, which, during the laſt month of their confinement proved very fatal to them; and ſome of them daily fell down, or rather *came* down of their own accord, from the combs to the ſtool, in ſearch of ſome aperture to get out at, in order to void their fœces; but, after crawling about on the bottom of the hive for a conſiderable time in vain, the cold benumbed them ſo much, that they could not return to their brethren again, and thus death enſued. Now, ſuppoſing only three dozen of bees *per* day to have come down upon this errand, and perhaps not a third of them to have been able to return, it is evident, that ſuch hives muſt of courſe be ſoon greatly reduced in the number of their inhabitants. This made me anxious for good weather, that my diſeaſed and diſtreſſed ſervants might get out, and recover their health, by flying about and getting rid of their ſuperfluous matter. The long wiſhed for period at laſt arrived. The ſtorm broke, and the weather became mild; and, upon examining my hives, I found, that out of fourteen, which I had in one apiary, there were twelve whoſe bees were in a healthy ſtate; and that thoſe of the remaining two were partly diſeaſed. The day being very fine, and the doors of my hives opened, the bees flew about as thick as hail, making a great noiſe with their uſual muſic. My wife being preſent, we obſerved, that the two diſeaſed hives gradually diminiſhed in the number of their bees, whereupon I ſaid, that I ſuppoſed the bees would ſoon deſert theſe hives altogether; to which ſhe replied, that ſhe wiſhed ed they would, and that they would go into ſome other hives, provided they did not fight. Upon farther obſervation, I found, that ſome of them entered into one hive; and ſome into another, till at laſt the original hives were totally deſerted, except the Queen and about a ſcore of bees; and that almoſt all the bees entered into thoſe hives that were moſt happy, as appeared by their making a moſt harmonious ſound at the entry of their hives, by which muſic they ſeemed to invite and welcome their new friends. The deſerted hives were well ſtored with honey, and therefore I turned them upſide down, and placed them below ſome of my other hives, in order that the bees might collect the honey that was in them. Such deſerted hives I have often found uſeful for putting a young ſwarm into.

I have even ſeen young ſwarms gradually deſert their hives in this manner, and go into other hives. When they go into one of their own maſter's hives, I never ſee any loſs by it, eſpecially when they unite peaceably; as one good hive is worth four bad ones.

It is worthy of obſervation, that the bees, on this occaſion, deſerted the weak hives gradually, and not in a body, as they do when they ſwarm; and alſo, that it may happen at particular times, that different men's bees, ſtanding in the ſame apiary, or near each other, may join together. Therefore, to prevent ſuch circumſtances from taking place, to the prejudice of others, it is neceſſary to allot a proper diſtance between one man's hives and thoſe of another.

Thoſe who live in places where vegetation is generally late, if they take the trouble to remove their hives to more early ſituations, eſpecially if they have a great number of them, will ſoon find themſelves doubly repaid for their trouble and expence, as their bees will thereby both breed and ſwarm much earlier. I would indeed adviſe every bee-maſter, who conveniently can, to keep two apiaries, an early and a late one, in conſequence of which, his bees will be conſtantly employed, when the weather is favourable, during the whole working ſeaſon.

In ſpring I generally ſhut up the doors of my hives every evening, as ſoon as the bees are all got in, and open them again next morning; and I even do this for whole days during that ſeaſon, when the cold is ſevere; as cold winds blowing in at their entries are extremely prejudicial to them, and ought therefore to be prevented with all poſſible care. By this ſimple practice, the bees are kept warm and healthy, which is greatly beneficial to them in breeding. But in following this plan, great caution muſt be obſerved, that the bees have no other vent to get out at, as the conſequences would be fatal. (See pages 100 and 101.)

In the beginning of March, if the weather be good, the bees will begin to carry home loads of honey and wax. I have ſeldom ſeen them carry ſo early as February, excepting in the year 1793, when I obſerved ſeveral bees go into one of my hives, heavy loaden, ſo early as the term of Candlemas; but I believe they hardly carried any more for a full month thereafter.

At this ſeaſon, every hive ought to be again lifted, and the ſtool cleaned; on which occaſion, the ſtate of the hive, both with regard to its proviſions, and the number of its inhabitants, will be diſcovered. Hives of twenty pounds weight ſtand in no need of any ſupply of food, and may therefore be immediately replaced upon their ſtools, and covered, and their ſkirts plaiſtered as formerly; but, ſuch as weigh only fourteen or ſixteen pounds ſhould be reinforced with ſix pounds of honey comb, as directed in page 110. Three pounds of honey will be a ſufficient ſupply for ſuch as weigh eighteen pounds. Some hives perhaps will not exceed fourteen pounds or ſo; yet, if they have few bees, they will not need to be ſupplied; for, beſides that they ſtand in no need of it, a freſh ſupply of honey would invite robbers, whom they would not be able, on account of the paucity of their numbers, to withſtand. A thinly inhabited hive ought, therefore, never to be reinforced with honey, unleſs the bees are ready to periſh for want of food, which, in ſuch a hive, ſeldom if ever happens. But a hive that is well peopled ought to be abundantly ſupplied, even although there may appear to be a ſufficiency of food, becauſe the ſuperfluity will not be loſt. The bees are faithful ſtewards, and will not fail to repay their maſter's generoſity with uſury. *

For

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* The ſupplying of bees with food, in any ſeaſon, but eſpecially in ſpring, is of great advantage to them, as it cheers their ſpirits, and rouſes them to breed earlier than they otherwiſe would. I would therefore recommend to every bee-maſter, to give a little additional food, even to hives that have abundance, in order to revive and exhilarate the bees, and encourage them

to

For I am confident, that when they are fully fed, they will breed faſt, even in bad weather; whereas, if they have little proviſion of their own, and receive no extra ſupply, they will breed very ſlowly.

From this, as well as from other peculiarities in the nature of theſe inſects, it appears pretty evident, that they are endued with a high degree of free or voluntary agency, as they can breed early or late, frequently or ſeldom, at pleaſure, and according to circumſtances. All poſſible attention, therefore, ſhould be paid to the full feeding of bees in Spring, and alſo in the beginning of ſummer, if the weather be unfavourable.

A hive will ſometimes loſe their Queen in ſpring, and of courſe will go to ruin, as it will then be impoſſible for the bees to raiſe another, if they have not an egg to raiſe one from. A hive may be known to be in this ſad predicament, by the following ſymptoms: The bees will

to hatch their young families, early in the ſeaſon. But ſuch hives as weigh heavy in March or April, having plenty of honey, with bees in them carrying well, may be ſafely allowed to remain without any freſh ſupply of food, as they will proſper without it; although, if the owner has time and abundance of honey, he may reap additional profit by giving them a little.

will immediately give over working as ſoon as the young in the cells are ſealed up; and one may wait an hour at the hive without ſeeing a loaded bee enter it. The bees then conſume their own honey faſt, and an uncommon number of them generally croud about the entry: And if the hive has been long without a Queen, upon turning it up, and ſearching for maggots in the cells, they will be found quite empty.

As ſoon as theſe melancholy ſigns are obſerved, the owner ſhould directly take out all the bees, and unite them with thoſe of ſome other hive, that has few bees in it, the manner of doing which will be afterwards mentioned: and if the hive be young, it may be kept to put a young ſwarm into, but if old, the honey ſhould be laid aſide for uſe.

Sometimes, in ſpring, I have found, in particular cells in hives, a conſiderable number of young that, from ſome cauſe or other, had decayed and never come to perfection, as mentioned, page 64. I have ſometimes obſerved the number of theſe ſo great, that in one comb, containing perhaps 600 young bees, the one half would have been in this ſtate in the cells. The effluvia proceeding from theſe abortive productions, gave the hive a ſavour by no means agreeable to me, and which muſt doubtleſs have been very diſguſting to the bees. I have often endeavoured to inveſtigate the cauſe of theſe phænomena, but am as yet unable to ſatisfy myſelf, unleſs perhaps it be owing to extreme cold. But againſt this ſuppoſition the objection naturally ariſes, that ſome eggs in the ſame hive, and in the ſame degree of cold, produce bees which arrive at full maturity; and, therefore, in reply, it muſt be taken for granted, that ſome eggs are naturally more able to bear cold than others; and, indeed, it is moſt commonly in hives that are but thinly inhabited, that ſuch misfortunes take place.

To diſtinguiſh hives in this condition, therefore, the following criterion may ſerve. In ſpring, when bees, which formerly carried well, and ſtill are in no want of food, give over carrying, let the hive be directly turned up, and inſpected between the combs. Then, upon taking a ſmall ſtick, and putting it down among the thickeſt of the bees, where the maggots lie ſealed up, and with it rubbing off the tops of two or three of the ſealed cells, if freſh whitiſh maggots appear, it may be concluded, that the brood is coming forward: but if the cells appear quite empty, or if only blanched maggots appear in a number of them, then it is certain that the brood is going backward.

If ſuch a hive has but few bees, it will be proper to unite them with another hive; but if it has a conſiderable number of bees, they ſhould be allowed to continue to work on, in the beſt way they can, till the beginning of June, when the ſtrong hives begin to lay out; at which time a great number of common bees ſhould be taken from one or two of them, to re-inforce that hive with, in the manner that ſhall be afterwards pointed out. I have ſeen a hive, with a vaſt number of ſuch rotten eggs and decayed maggots in it, in April, which, when allowed to remain till June, and being re-inforced with freſh bees, would have turned out a fine thriving hive before autumn; although many of the decayed eggs and maggots would have ſtill been in it: For I believe ſome ſuch abortions may continue in a hive for-years, perhaps with little detriment to the bees; for they in time dry up, and wither away in the cells, and their bad ſavour gradually goes off. Such hives, however, ſhould always be taken in autumn; and their bees united to more thriving hives. *

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* Formerly I uſed to cut out the combs containing the moſt

In May, if cold, miſty, or cloudy weather, continues for a few days, the bee-maſter ſhould pay particular attention to his hives, leſt any of them ſhould be in danger of famine; for, at this period, the number of bees in each hive is greatly increaſed, and of courſe they quickly conſume the remains of their winter and ſpring proviſion, ſo that even the very beſt of hives will be in danger. When ſuch weather occurs, therefore, in May or even in June, let every hive get ſome additional food, in order to prevent all danger of famiſhing, now that they are juſt upon the brink of their honey harveſt. For, as ſoon as the muſtard bloſſoms, and the white clover appear on the lees, they will make the very air to ſmell of

rotten eggs, and the moſt decayed maggots, whereby I cleared the hive of a great nuiſance, which I thought it would be much the better of wanting. But, in doing this, I found that the removal of ſuch maſſes of combs occaſioned a large vacancy in the hive, and thereby made it colder. To remedy this defect, I have ſometimes put a piece of freſh comb in its place, in which I found the Queen ſoon laid eggs again. But ſtill, as in theſe combs, containing the decayed eggs and maggots, there could not be fewer than one third, or perhaps one half of live young, intermixed among the abortions, which thus inevitably periſhed, I began to regret the loſs of ſo many induſtrious ſervants thus deſtroyed, when juſt emerging into exiſtence; and have, therefore, now laid the practice almoſt entirely aſide.

of honey, which will make the bees eager of work during the day, and ſing for joy through the night. Now is the honey ſeaſon, and farewell famine and robbers; for, when there is honey in the flowers, they will not rob for it; and, a ſingle hour of a fine day will refreſh them, and put a period to the labour of feeding them, as formerly hinted.

When the flowers begin to open, the bees will viſit them, and carry off their yellow loads from them. When a loaded bee is ſeen going into a hive, it is a ſign that the flowers are beginning to ſpring; and, on every fine day during ſpring, ſummer, and autumn, they continue to carry on the beloved labour, with the utmoſt diligence and alacrity.

The firſt day in ſpring, that I obſerve a bee carrying a load, I generally call my family together, to take a glaſs, and rejoice with me and my faithful ſervants at the return of the ſalutiferous ſeaſon. The firſt day, perhaps, only three or four loaded bees aro to be ſeen; the next day, probably eight or ten; the third, fifteen; and ſo on, the numbers ſtill gradually increaſing, in proportion to the increaſe of the flowers in the fields. The bees then grow numerous in the hives; and, about the beginning of May, when the furze and broom, and many other flowers, make the fields look yellow, a ſtrong hive of bees will be all yellow loaded; and, at ſuch a period, in a fine day, I have counted 100 loaded bees go into one hive in a few minutes.

When the hives are all equally good, the bees carry much alike, but in proportion to their number. In an apiary, where there are four hives, one will perhaps have twenty entering into it, in five minutes; another fifty, a third ninety, and the fourth a hundred and twenty, all within the ſame ſpace of time. But in the height of the honey ſeaſon, the bees carry amazingly faſt, running out and in to the hive with the moſt ſurpriſing celerity and expedition. At this period, the number of loaded bees conſtantly flocking into the hive, as well as their rapidity, defies all power of calculation; for although they labour with great aſſiduity and conſtancy before this ſeaſon, yet they do not appear to work with ſuch incredible quickneſs, as after the honey ſeaſon commences §.

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§ In ſpring, as the bees gradually increaſe in numbers, their entry ſhould be gradually widened, leſt they ſhould be impeded

If I were intending to purchaſe a hive in May, and came to an apiary where there were four hives, to make choice of one, I would deſire four men to ſit down for ten minutes, one at each hive, and count the number of loaded bees that entered into their reſpective hives in that ſpace of time; and according to their report, I would pitch upon the hive that was moſt frequented during that interval, provided it had honey, and were not one of the oldeſt.

CHAP.

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peded in their labours; but this ſhould only be done in proportion to the number of bees in a hive. During March and April, they ſhould be very little, as warmneſs is health to bees, and farthers their hatching greatly. A numerous hive ſhould, in May, have an entry two inches wide, and half an inch deep, while a hive, that has not perhaps half the number of bees, ſhould have its entry only one inch wide and ſcarcely half an inch deep. But in the midſt of ſummer, when the weather is warm, and the bees numerous, the entries of all the hives ſhould be widened, as the bees ought to have both ſufficient room to go out and in, and as much air as poſſible. In ſuch hot weather, the entries might even be enlarged to three inches in wideneſs, and one inch in height. The method of enlarging or ſtraitening the entries of hives is quite ſimple. Pieces of wood, all of one ſize outwardly, but with holes cut in the under part of them, of the various dimenſions above deſcribed, might be made and kept ready at all times, to be exchanged with each other, according as the ſeaſon requires, or the Bee-maſter wiſhes to widen or to ſtraiten his hives; but indeed a little plaſter lime will ſtraiten or widen an entry in ſpring and ſummer, with very little trouble.

CHAP. XVIII.

HOW TO UNITE OR RE-INFORCE BEE-HIVES.

As the uniting or re-inforcing of bees is often neceſſary to be performed during the ſame ſeaſon of the year, that they naturally ſend off young ſwarms, theſe two ſubjects will often fall to be occaſionally intermingled in ſuch a manner, that the one cannot be particularly deſcribed without taking notice of the other. But as each article is of too much importance, not to require a ſeparate chapter, and of courſe a *precedence* to one of them, I ſhall firſt deſcribe the UNITING OR RE-INFORCING of bee-hives, as it is often neceſſary in different ſeaſons of the year, and ſhall devote a ſubſequent chapter or two to the ſubject of SWARMING.

In handling bees at all times, but eſpecially when driving them, or managing a ſwarm, gentleneſs and boldneſs are equally neceſſary.

Every motion muſt be made deliberately, and without hurry. The operator may take a glaſs of good ale, and rub ſome of it over his face and hands; but during the whole operation he muſt be particularly careful not to bruiſe any of the bees.

In uniting and re-inforcing bees,* upon the very

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* To RE-INFORCE a hive, ſignifies to take part of the bees out of a ſtrong hive, and put them into a weak or deficient one, in order to ſtrengthen it, and make it a thriving hive. But one thing to be obſerved here, is, that no bees muſt ever be taken from a ſtock hive to re-inforce another with, unleſs in ſummer, when the hive is ſo full of bees as to lay out, or nearly ſo; for no good hive ought at any time to be hurt to enrich a weak one. It is often a very neceſſary and uſeful operation, when a hive has few bees in ſummer, by re-inforcing her from a more numerous hive that can eaſily ſpare them, the weak hive will ſoon become ſtrong. Or ſhould a misfortune befal a hive at any ſeaſon of the year, the bees of the unfortunate hive ſhould be put into another hive; and in September, all the bees belonging to the hives which are taken, ſhould be put into the ſtock hives, whereby they will preſerve heat through the winter, and be able to accelerate their labours in the ſpring.

In all caſes whatſoever, where it is neceſſary to remove the bees out of one hive into another, the new hive muſt be placed in the ſame ſpot where the old hive ſtood, to prevent the bees from miſtaking it. But when a hive is re-inforced by an additional number of bees, if theſe bees are taken from three or four different hives, ſituated in as many different places, the re-inforced hive ſhould be removed about a mile diſtant from all of them, to prevent the new inhabitants from returning to their original hives again;

very beſt plan that I know of, they will ſometimes fight a little; but, although I cannot abſolutely prevent this inconvenience, nor indeed have I ever met with any author, or ſeen any perſon, who could take in hand to do it, yet I can uſe ſuch means, as will probably prevent any conflict from taking place in one of a dozen of theſe operations; and, although a few battles may occur among ſome individual bees, yet in general very few will be killed on either ſide. I am, therefore, never afraid to unite them, when I have reaſon to believe it will anſwer a good purpoſe in other reſpects. But, in all caſes of uniting bees, particular care ſhould be taken firſt to try the deficient hive with a ſpecimen of the bees that are intended to be introduced into it; and if theſe *ambaſſadors* are graciouſly received, the reſt of their brethren may be ſafely offered: But, if otherwiſe, the whole of the bees ſhould be kept back, till thoſe of the receiving hive ſhall be in

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again. But after ſtanding ſix weeks, it may be returned back to its former ſituation. The above general directions, I think abſolutely neceſſary to be obſerved, in driving, re-inforcing, and ſwarming of bees; and I am perſuaded they will anſwer in moſt caſes, though particular circumſtances may occur, wherein the practical bee-maſter's judgment muſt direct him; as it is impoſſible to anticipate every contingency, in a limited work of this nature.

better humour; for, it is to be remarked, that the ſame bees will often fight at one time, who will unite in the moſt kindly manner at another; on which account the receiving hive ſhould always be previouſly tried, with a ſpecimen of their intended new aſſociates.

To drive all the bees out of a hive, at any ſeaſon of the year, either to re-inforce another hive, or to raiſe an artificial ſwarm, the hive muſt be gently turned up, and the top of it placed in an eek, or in a hole made in the ground on purpoſe, to prevent it from being overturned. An empty hive of the ſame ſize muſt then be gently placed over it, mouth to mouth, and a ſheet, or large cloth, wrapped round the joinings of the hives, to prevent any of the bees from getting out. The undermoſt hive muſt then be rapped with both hands in the manner a drum is beat; rapping chiefly on thoſe parts of the hive to which the edges of the combs are fixed, and avoiding the parts oppoſite to the ſides of the combs, leſt they ſhould be looſened, and, by falling together, cruſh the bees between them, as well as the young in the cells. Even the Queen herſelf might be in danger of ſuffering. By not adverting to this, I have ſeen the looſe combs and bruiſed bees fall out upon turning up the hive, all of which are a conſiderable loſs. The older any hive is, there is the leſs danger of looſening the combs; and the more bees there are in it, the ſooner they will run into the new hive; for the concuſſion of the hive, by the rapping, alarms them, as an earthquake alarms mankind, and they run to the upper hive in ſearch of a more ſafe habitation. Thoſe that enter firſt, finding themſelves ſafe, invite their brethren by their ſounding to follow them, which they quickly do. The ſheet may then be removed, and the edge of the upper hive next the right hand lifted up, when, upon a narrow inſpection, the Queen ſometimes will be obſerved to go up along with the reſt.

When all the bees are thus removed into the new hive, it may be placed where the old one ſtood, which will collect all the bees together, and within ten minutes, they will fall a working as buſily as any natural ſwarm.

It is neceſſary, before this operation, to remove the hive, eight or ten yards at leaſt, from every other hive, to prevent diſturbance from other bees. An empty hive ſhould alſo be placed where the old hive ſtood, to amuſe thoſe bees belonging to it, that may return loaded from the fields. This operation may be very eaſily performed at any hour of the day; but the ſafeſt time is when they are moſt buſy at work, as they are not then ſo ready to ſting the operator. In this manner, I have taken off four artificial ſwarms in one forenoon, and hardly received a ſingle ſting; for the operation is quite eaſily performed, eſpecially in the middle of the day. †

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† Indeed, there is hardly any thing that is requiſite to be done about bees, that I would not take in hand to perform, with ſufficient time and attention.

I could put TWENTY hives, for inſtance, into ONE, if neceſſary: I can cauſe my bees to rear as many Queens as I pleaſe: I can rob my bees of part of their honey, at any time: I could carry 100 bee hives to LONDON or RUSSIA: I could rear 5,000 bee-hives in a few years, if deſired by any gentleman of property: I could travel through the ſtreets of Edinburgh with three ſwarms of bees about me, unhurt: I can take a ſwarm out of any hive at any time: I can take 10,000 bees from ten different hives, and unite them into one hive; and I can re-inforce a weak hive with bees from any number of other hives, and from being the WORST, make it the BEST hive in the county; I can unite the bees of forty hives into thirty, twenty, or ten hives; and next Summer divide theſe ten hives again into forty ſwarms: If I have a weak hive ſuffering by robbers, I can ſtrengthen it with more bees, and make them fit to rob any hive in the neighbourhood: If I have a hive of bees periſhing with poverty or famine, I can make it the richeſt hive in the place, or within many miles around: I can take a common bee egg, and cauſe

In ſummer, a weak hive, that has few inhabitants, may be re-inforced with a number of bees from a ſtrong one, in the following manner: Suppoſing there are two apiaries, a mile diſtant from each other; and that, in one of them, there are a weak hive and a ſtrong one, ſituated within two feet or two yards of each other; and no other hive near them: in ſuch a caſe, let the ſtrong hive be removed, about ten o'clock A. M. when the bees are buſy at work, to twenty or thirty yards diſtance, and let the weak hive be placed where the ſtrong one ſtood. All the bees, belonging to the ſtrong hive, that were abroad in the fields, will thus, on their return, go into the weak hive and unite peaceably with its inhabitants. Upon this plan, ſcarce one of twenty will fight; but if they ſhould, which is ſeldom the caſe when they are buſy at work, then the ſtrong hive muſt be immediately brought back, and placed in its former ſituation; and the weak hive turned up and rapped heartily, upon which the

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cauſe the bees raiſe it to be either a Queen or a common bee as I pleaſe: I can make my bees reſt upon myſelf or any perſon near me, without offering us the ſmalleſt injury; and I can make them fall upon us with the fury of as many dragons, ſo that we would be glad to fly with as much precipitation, as a few rioters would do before a regiment of dragoons.

the bees will return to their own hive again; and the weak hive may be placed in its former ſituation. But when a part of the bees of the ſtrong hive unite peaceably with thoſe of the weak one, the ſtrong hive ſhould be carried to the other apiary: for ſhould it be placed too near the ſituation where it formerly ſtood, too many of its bees might go into the weak hive, and thus the one be impoveriſhed by enriching the other. Another method, to re-inforce a hive with bees, is to bring it into a clean room, where there is only one window; then turn it up, and rap upon it, till ſome hundreds of the bees fly to the light. They will run up and down the glaſs in a bewildered manner, wondering, (we may ſuppoſe,) how the air has become ſo thick, that they cannot paſs through it. Let them remain in this ſituation for about twenty minutes, which will cool their courage for fighting. Then let three or four ſcore of thoſe bees, that are wiſhed to be united to them, be introduced cloſe to them. Theſe will appear as much bewildered as the former, by the glaſs preventing their egreſs, and will readily unite with them, without killing a ſingle bee. Upon finding them thus agree, let them all be brought to the window; and a ſhort time after, let the hive be placed near them, and they will all run into it chearfully: after which the hive, thus re-inforced, may be placed in its former ſituation, provided it be about a mile diſtant from the place where the old hive formerly ſtood. Upon this plan, even all the combs may be taken out of a hive one by one, during which time, the bees will fly to the window, and a few of the bees of the receiving hive being made to join them, upon their uniting kindly, the receiving hive may be placed as above directed.

I have often re-inforced weak hives in ſpring, which have done very well, though, at other times, they turned out very indifferently. I therefore ſeldom attempt to do it now, till the ſtrong hives are full of bees, and ſeem to be near ſwarming: on which occaſions they can afford 2000 common bees to ſtrengthen a weak hive, with very little injury to their own.

Again, in ſummer, a weak hive may be re-inforced by changing its ſituation with that of a ſtrong one, upon a fine day, when the bees are buſily employed at work. I have often practiſed this buſineſs with much ſucceſs and ſatisfaction. But, if they ſhould not unite in a friendly manner, let both be turned up, the ſtrange bees rapped out, and each hive reſtored to its former ſituation.

CHAP. XIX.

OF HABITATIONS PROPER FOR BEES TO LIVE AND WORK IN.

HIVES, or the habitations in which bees live, breed and work, have been made of different materials, and in different forms, according to the fancy of people of different ages and countries. MELISSUS, king of Crete, is ſaid to have been the firſt who invented and taught the uſe of bee-hives. Not only ſtraw, which experience now proves to be rather preferable to every thing elſe, but wood, horn, glaſs, &c. have been uſed for the conſtruction of hives. Single box hives, however, when properly made, anſwer very well, and, when painted, laſt long. They have ſeveral advantages above ſtraw hives: They are quite cleanly, and always ſtand upright; they are proof againſt mice; and are cheaper in the end than ſtraw hives; for one box hive will laſt as long as three of them. I have known many bee-maſters, who never uſed any other kind of hives, and whoſe bees throve very well. I believe, however, they are rather colder in winter, but a proper covering will prevent all danger from that quarter. But ſtraw hives are eaſieſt obtained at firſt, and have been uſed and recommended by the moſt of bee-maſters.

As to the ſize, a hive that will hold about 2½ pecks, Linlithgow meaſure, will hold a pretty large ſwarm; but there is no certain rule to judge what hive will be exactly filled by a ſwarm. Much depends upon the ſucceeding ſeaſon. If the ſwarm be early and large, it will require a large hive; but if otherwiſe, the hive ſhould be proportionably leſs. If a ſwarm be put into one of the ſize above mentioned, and the bees fill it ſoon, and appear to want more room, it can eaſily be enlarged, by putting an eek below it: but if it be heavy enough for a ſtock hive, it will do, although it ſhould not be quite full of combs.

A ſtraw hive, when made, ſhould have a piece of wood, fixed in the undermoſt roll, four inches long, with a notch cut out of it, three inches long, and one high, for an entry to the bees. The ſtraw of rye or wheat is beſt for making hives: The heads of the ſtraw ſhould be cut off; The rolls ſhould be drawn very tight, and wrought together with ſmall willows or brambles, ſplit and properly dreſt, with the pith taken out of them. The hives ſhould be made as ſmooth as poſſible, without leaving any projecting ſtraws; which, when not cut or ſinged away, (as ſhould always be done when the hives are rough,) would occaſion much unneceſſary trouble to the bees, when put into them, to gnaw them off. When the hives are made, and, if neceſſary, gently ſinged with ſtraw, four ſmall ſticks ſhould be fixed acroſs the inſide of them, at proper diſtances, in order not only to keep the hive firm, but alſo to prevent the combs from falling down, (which they would otherwiſe do by their own weight;) or from being ſhifted out of their places, when the hives are rapped upon, or diſturbed accidentally.

Some ingenious gentlemen have made their hives to conſiſt of different apartments, though inhabited only by one ſwarm. This kind of hives are called COLONIES; but I do not much approve of them; as the partitions prevent that accumulation of heat, which is neceſſary for the health of the whole family; and as ſome of the rooms muſt be colder than others, the bees, eſpecially in winter, will all draw to one place; leaving the other apartments empty, and expoſed to ſuch a degree of cold, as will probably make the honey candy and become uſeleſs. Beſides this method is unnatural, for the bees always lodge in one apartment, when left to their own liberty, provided it be large enough to hold them: and as they lay their eggs in the middle part of their combs and hives firſt, and afterwards gradually enlarge the brood around the centre of the hive, they not only get them more eaſily defended from all danger, but alſo ſooner hatched, by the ſuperior degree of heat.

Colonies have never yet been, and I am perſuaded never will be extended to general uſe, although it is nearly two centuries ſince they were invented by JOHN GEDDY, Eſq. I will not deny, however, that bees may thrive pretty well upon this plan; which muſt be allowed to have one advantage, as, when properly conſtructed, theſe hives afford an opportunity to the inquiſitive philoſopher of ſeeing the bees carry on their labours. Colony hives are made in various forms, according to the taſte of different gentlemen. Some conſiſt of three boxes, placed one above another; others of an equal number placed collaterally; and a third kind are made with one box in the front, another behind that, and the third behind the ſecond. All theſe different kinds have ſquare holes in the ſides or tops of the boxes, to allow the bees liberty to go from one box to another, as they may find neceſſary; and there are ſmall panes of glaſs fixed in them, in order to obſerve the operations of the bees; with wooden ſhutters to cover the glaſs, when it is not intended to inſpect the hive.

I have ſeen, in thoſe favourable years when the bees had ſwarmed very liberally, that the proprietors have been greatly diſtreſſed for want of hives, to receive their ſecond and ſubſequent ſwarms. But an experienced bee-maſter will never be at a loſs in ſuch circumſtances. If all his empty hives are filled, and if he intends to take honey in Autumn, he will find many other articles in which they will chearfully build and work; ſuch as any large jar, half barrel, tub, pot, or box of any kind, that is large enough. For the bees are not delicate in their choice of a habitation; witneſs the well known inſtance of SAMSON's dead lion.

ſon. They will work in any place during Summer; for although the manufacture of honey and honey combs is ſo natural to them, that they can work at no other employment, yet the *ſhop* in which they make them, is a matter of indifference to them, provided it is only large enough, and capable of excluding cold, rain and robbers. Even darkneſs itſelf is no diſparagement, but rather renders their habitation more agreeable to them.

CHAP. XIX.

OF THE NATURAL SWARMING OF BEES.

As it would evidence a conſiderable degree of folly to deſert an old beaten path, for a new road, unleſs the latter were both nearer and better, ſo I would by no means recommend artificial ſwarming, if natural ſwarms can be obtained. But even, in the latter caſe, many uſeful directions may be given, and ſhall be laid down in as plain a manner as poſſible.

We ſhall likewiſe ſhow, how it is ſometimes equally neceſſary and advantageous to make artificial ſwarms, along with the manner of doing it to the beſt advantage, when it is neceſſary.

As the time when a hive will throw a ſwarm is quite uncertain, eſpecially to young beginners in the bee-huſbandry, a conſtant attendance is neceſſary in ſwarming time, from eight o'clock in the morning till about three or four in the afternoon. But this may be done with little trouble or expence. A boy, or a girl, or any old perſon, may be employed to watch the bees during theſe hours; and this needs only to be done in fine days, as the bees ſeldom ſend out a colony in cold, damp, or chilly weather.

Some hives will ly out long before they ſwarm, though they will ſwarm at laſt; others, although they lie out equally long, will not ſwarm at all; a third claſs will ſwarm without the ſmalleſt previous appearance; and a fourth will make a buſtle about their doors, for three or four days before they ſwarm: And, therefore, from ſuch a variety of chances, it is ſcarce poſſible to determine the preciſe time of ſwarming; although we may reaſonably conjecture, from the following ſymptoms, that this wiſhed for period is approaching.

When the number of bees in a hive increaſes faſt, about the end of May and beginning of June, and drones appear among them; if a ſhort time before this, water of an inſipid taſte appeared on the ſtool, about or within the entry; if this water, which is called *ſweat*, and is occaſioned by the increaſed heat of the hive, be dried up, by the ſtill greater increaſe of that heat, from the bees becoming more and more numerous; if the bees, about 11 o'clock, A. M. fly about in a reeling manner, making a noiſe and motion about the front of the hive; all theſe are ſigns to put the Bee-maſter on his guard, and to prepare him for the joyful event that is faſt approaching, of a young colony within a day or two, or even, perhaps, within an hour or two. But if the bees, after all this, run haſtily up and down the outſide of the hive, and at laſt gather together in a cluſter upon the ſtool, he may call his friends together, to behold his increaſing ſtore, as he may depend that they will ſwarm immediately: * and nothing can ſurely be more delightful to the bee-maſter, than to behold the young emigrants flying in the air and darkening the ſky with a thouſand varying lines.

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* It is indeed ſurprizing, to ſee the young colony leaving their mother

Mean-time, while he is ſatisfying his curioſity as to the manner of their ſwarming, he ſhould obſerve, whether they are beginning to ſettle upon any place, in, or near his own apia-

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hive, and deſerting it ſeemingly in the utmoſt hurry and precipitation, in ſo much that they can hardly clear the way for each other. A ſtranger to the nature of theſe wonderful inſects would be apt to conclude, that there was ſome formidable enemy within, who was murdering them by wholeſale, and from whom they were flying for their lives; or elſe that they were leaving a diſagreeable habitation, where there was nothing but war and poverty; and emigrating to ſome happier ſituation, where they would enjoy peace and plenty. But the reverſe of all this is the truth; for they are going away of their own accord, chearfully parting with their deareſt friends, and leaving a warm habitation, and well-ſtored granary, to ſeek their fortunes in a new ſituation, where they will have every thing to provide for themſelves, and all the varieties and inconſtancy of weather and climate to ſtruggle againſt.

An old cuſtom ſtill prevails with many, when a ſwarm of bees are riſing, to make a tinkling noiſe upon a pan, or kettle, as they think that the noiſe makes them ſettle the ſooner, and prevents them from flying away. But I am of opinion, that when the ſwarm comes naturally off, it is proper that they ſhould hear and underſtand each other, which a noiſe of this kind will prevent. On all ſuch occaſions therefore, I uſe none. But, when the bees attempt to fly off, all kinds of noiſe ſhould then be uſed, to frighten and prevent them from hearing each other, and thus incline them to ſettle at home.

ry, or attempting to fly away, which they they will ſometimes do. If the former, he ſhould keep at a diſtance till they ſettle, as going near them might not only prevent them from ſettling, but might alſo occaſion the death of ſome of them, by trampling upon them.

As ſoon as they alight on any thing, that can eaſily be brought to the ground, ſuch as the ſmall branch of a tree, or a berry buſh, or the like, let a ſheet be ſpread on the ground near the ſwarm, and two ſticks placed upon it, a foot aſunder. Then place the ſwarm upon the ſheet, between the ſticks, and gently cover it with a hive †, reſting the edges of the hive upon the ſticks, to prevent it from cruſhing any of the bees; who will thus have free air, and acceſs to and from the hive, which muſt be covered with a cloth, to prevent the rays of the ſun from ſcorching the bees, and provoking them to riſe and ſeek out a more comfortable habitation. If their new lodging pleaſes them, they will take

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† Some adviſe to rub the hive, before it be placed over the ſwarm, with a little honey, or ſugar and ale mixed, in order to allure the bees. This can do no harm, but I ſeldom adopt the practice, as I have ſeen little or no benefit from it; the Queen getting into the hive is the only allurement to excite the bees to go into it, and alſo to keep them there, when they are gone ſafely in.

immediate poſſeſſion, and fall to work with alacrity. Sometimes, after continuing two or three hours in it, and beginning to work, they will riſe and ſettle on ſome other place, or go back to their mother hive again; and ſometimes they will fly off altogether, in ſearch perhaps of a habitation previouſly fixed on. They muſt therefore be carefully watched till the heat of the day be over, after which, it may be preſumed, they will not riſe again.

As ſoon as the young colony are fairly lodged in their new habitation, let the hive be placed on a ſtool, and carried with all due caution to the place where it is intended to ſtand ‡; for the ſooner the hive is ſtationed, the ſooner the bees will be acquainted with its ſituation. A few ſtragglers, indeed, may fly about the place where the ſheet was firſt laid down; but they will ſoon either find out the ſwarm, or return to their mother hive, either of which will be no loſs. When the hive is placed in its proper ſtation, the cloth ſhould be allowed to remain upon it, to keep off the rays of the ſun §, till night, when the ſkirts may be plaſtered over with lime mixed with hair, and thus fixed to the ſtool, and the top covered with turf, as formerly directed, page 97.

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‡ At all ſeaſons, as ſoon as a ſwarm is fairly ſettled, both the ſize of the ſwarm and the ſeaſon of the year ſhould be taken into conſideration. If the ſwarm be pretty numerous, if the mother hive can bear the want of it, and if the ſeaſon be not too far advanced, let it be put into a hive by itſelf. But directions will afterwards be given, how to act if any of the contrary circumſtances occur.

Sometimes, though ſeldom, a ſwarm will fly off, notwithſtanding every method that can be uſed to prevent it. This happens only in very fine calm weather, when the bees have

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§ Sometimes, in very hot weather, young ſwarms have ſuffered greatly, by the intenſe heat melting the wax, and making their combs fall down on the ſtool, in conſequence of which the honey runs out, the bees are beſmeared, the young ones bruiſed, and the hive almoſt totally ruined. Many hives ſuffered in this manner, by the great heat laſt ſummer, (1794;) but ſuch misfortunes only happen in the beſt years for honey; and, indeed, it is to be regretted, that we have ſo ſeldom reaſon to complain of too much heat.

In ſuch favourable years, the beſt method to prevent ſuch conſequences, is to keep the young ſwarms, (for the ſtock hives are in no danger,) well ſcreened from the ſcorching rays of the ſun, by covering them over on the ſouth ſide, or placing ſcreens before the hives in ſuch a manner as to keep off the heat, at the ſame time, that they do not obſtruct the bees from going out and in to their work. One of the large boards or ſtools, which the hives uſually ſtand on, being placed on edge upon the ſtool before the entry to the hive, but in ſuch a poſition that the bees may have free acceſs and egreſs, will anſwer this purpoſe, and can eaſily be removed, as ſoon as the exceſſive heat is over.

had liberty ſome days before ſwarming, to roam about in ſearch of a commodious habitation; which, if once they find, it is difficult, and often impoſſible, to prevent them from emigrating to it. When the weather is very favourable, the bees often, before ſwarming, ſend out ſcouts in ſearch of a proper habitation; and when they diſcover a hive whoſe bees are dead, or any empty place about the roof of a gentleman's houſe, or a church, caſtle, or trunk of a tree; more eſpecially, if bees have wrought combs in it the ſummer before, but have died out of it in winter, they will ſend out a ſquadron of bees, three or four days before they ſwarm, to clean out the place, and render it fit for the reception of the young colony, the firſt favourable opportunity. At ſuch places, I have often ſeen a conſiderable number of bees, buſily employed in clearing away the dead bees, broken crumbs of wax, and all other rubbiſh; and ſometimes I have obſerved bees from different hives, laying an equal claim to the newly diſcovered habitation, and, as mankind too often do in ſimilar caſes, fighting and killing each other for the uninhabited territory; for, two ſwarms have been ſeen flying to ſuch a place in one day, in which caſe a bloody battle between them often becomes inevitable.

There have been many inſtances of a ſwarm of bees flying in a direct line to a dead hive, when it happened to be within their reach in a neighbouring apiary. Such hives are often left ſtanding by the owner, either from his not knowing that the bees are dead, or from his ignorance of the conſequences. They are alſo frequently left by roguiſh bee-maſters, on purpoſe to entice their neighbours ſwarms; which is as villainous as ſtealing a ſwarm, if not more ſo. Mr Maxwell ſays, there is a law againſt ſuffering a dead hive to ſtand in an apiary. If there is, it is a very juſt one, but if not, an act of parliament ſhould be paſſed againſt ſuch a pernicious practice. Such cauſes have been ſeveral times tried in courts of juſtice, and ſome judges have puniſhed the treſpaſs, which was certainly juſt. But I lately heard of a cauſe of this nature, which was tried before a judge, who aſſoilzied the aggreſſor, upon this principle, that every man has a right to keep what he pleaſes in his own garden. By this deciſion the judge evidenced his ignorance; for, if ſuch a precedent were once eſtabliſhed as law, no perſon, who has a covetous bee-maſter in his neighbourhood, would be ſure to loſe ſome ſwarms of his bees; for, a dead hive, left ſtanding in an apiary during ſummer, ſeldom fails to receive a ſwarm before Lammas.

Many have been not a little difficulted how to determine, whether the old hive that the ſwarm went into, had living bees in it or not, before that event took place. One eaſy method of deciding this point, is, by inſpecting it, to ſee if there are live young in it; and another is, by the diſtance from which the ſwarm has come; for, I know for certain, that a ſwarm will not fly a mile to a living hive; whereas, they will fly four miles to take poſſeſſion of an old one with combs in it, whoſe inhabitants are dead. I have, indeed, ſeen a ſwarm go into a living hive, that ſtood in the ſame apiary; but this was rather accidental than otherwiſe. The Queen returning home in confuſion, perhaps from a fruitleſs expedition, might miſtake another hive for her own. In ſuch caſes, a great battle frequently enſues, in which many are ſlain, and often the Queen among them. Sometimes I have ſeen them agree very well, and make a good colony, when the hive was properly raiſed with a very large eek. At other times, I have ſeen a ſwarm, after joining another hive, being well received, and remaining in it very peaceably, come off, notwithſtanding, the very next day.

When a ſwarm emigrates, with a view to ſettle in ſome habitation, which their ſpies had previouſly diſcovered, they fly to the place in a direct line. The bee-maſter ſhould, therefore, run or ride along with them, as far as he can; for on ſuch occaſions they ſometimes fly ſo ſlow, as a perſon who is ſwift of foot may accompany them. But if he ſhould be prevented from following them in a direct line, by any interruptions from woods, waters, or incloſures, let him, upon recovering the line, proceed ſtraight forward, without turning to the right or left, and the chance is ten to one that he will diſcover them, eſpecially if they happen to alight or reſt upon any dike hedge, or bruſh by the way. But ſhould this not happen, upon proceeding ſtill forward, the line will probably lead him to ſome garden where there is an apiary; the owner of which ſhould be told the caſe; and if he is an honeſt man, he will doubtleſs allow his hives to be ſearched, in the preſence of witneſſes, to ſee if the ſwarm have taken up their abode in any of his dead hives. This will eaſily be diſcovered by examining the entries of his hives, and if there are any ſmall crumbs of wax lying like as much ſaw duſt, on the ſtool before them, it may be preſumed, that the bees of the new ſwarm have cleaned it off the combs; and, therefore, a farther ſearch ſhould be demanded; and upon turning up the hive, and ſearching with a ſmall ſtick for young bees in the cells, as directed, (p. 129) the matter can ſoon be decided, whether the hive was inhabited by living bees, previous to the ſwarm entering it, or not. If ſealed up maggots, or young bees appear in the cells, the owner of the ſwarm can have no claim; but if none of theſe appear, he has a right to the hive, which, if the proprietor of the apiary ſhould refuſe to deliver, he ought to be inſtantly ſummoned before a Magiſtrate, while the hive is ſtill totally deficient of young bees; when the caſe being plainly ſtated, and *this deciſive proof* adduced, the young ſwarm will doubtleſs be ordered to be reſtored, and the greedy proprietor of the dead hive in all probability fined for his covetouſneſs.

But if the ſwarm ſhould not have alighted at the firſt apiary in the direct line, the owner ſhould ſtill proceed ſtraight forward, and he will in all probability arrive at another apiary, where the ſame inquiries and mode of inveſtigation ſhould be repeated: Or if any hollow tree,, church, gentleman's manſion-houſe, old ruin, or any other building, ſhould happen to lie in the direct line, they ſhould be inſpected attentively, and proper inquiries made at the people in the neighbourhood, if they obſerved a ſwarm of bees flying or ſettling on any of them. By theſe means perſevered in, a diſcovery will certainly be made; and if the ſwarm has ſettled in any ſuch place, the following directions will ſhow the method of taking them out in this and other caſes of a like nature. If a ſwarm ſettle in a hollow tree, or any cavity of a building, it will be impoſſible to get it out by any other means, than taking them out by handfuls. Some indeed, alledge, that rapping will force them out; but not one ſwarm of twenty will yield to that method, unleſs the Queen can be laid hold of, and brought out. The owner ſhould, therefore, make as much room as poſſible, to get his hand introduced, ſo as to pull them out by handfuls, and put them into an empty hive; and as ſoon as he is ſo fortunate as to get hold of the Queen, he ſhould put her into the hive, where ſhe will prevent the bees from ſtraying; and thoſe that were ſtill remaining in the building or hollow tree, will quickly come to the hive, and join the reſt. In ſuch caſes, I have ſearched whole hours for the Queen, who generally hides herſelf with ſo much art, that it is extremely difficult to lay hold of her, although in ſuch ſearches I ſeldom failed to catch her at laſt. But when the Queen cannot, by any means, be got, and when all or the greateſt part of the ſwarm is recovered, let the hole be cloſe ſhut up, and a weak hive brought, and re-inforced with the common bees, (as directed page 142) which is the beſt uſe that can be made of them in ſuch caſes.

Before bees ſwarm the ſecond or third time, they do not ly out in cluſters about the hive or upon the ſtool; but as ſoon as they are ready, they come off in a body, even in weather that is by no means favourable. The ſigns, when theſe after ſwarms will come off, are more certain than thoſe that precede the firſt ſwarming; for, if the weather be good, one may almoſt prognoſticate the very hour. By liſtening at night to the ſound of a hive, about eight, ten, or twelve days, after the firſt ſwarm is gone off, that peculiar ſound, commonly called *tolling*, will be eaſily diſtinguiſhed. This ſound ſeems to be the royal proclamation iſſued by the young princeſs, to warn, or rather to invite her fellow emigrants to prepare for their intended journey. It ſounds, ſays one, as if the words *peep! peep! peep!* were rapidly pronounced fifteen or twenty times in half a minute. She then ſtops, and begins again repeatedly, like a chicken peeping for its mother, when it has loſt her. When there are ſeveral young Queens in the hive, there will be ſo many diſtinct voices repeating this call. I have ſometimes heard theſe princeſſes calling from all corners of the hive; and, as it were, anſwering each other; ſome calling out *peep*, *peep*, in a treble voice, and others anſwering in a voice rather more hoarſe, and comparatively like baſs *. When theſe ſounds are heard in

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* Almoſt all authors agree, that theſe peculiar voices proceed from the young Queens *petitioning* (ſo to ſpeak,) for *leave* to emigrate with a young ſwarm. I have ſometimes thought, however, that this noiſe might alſo proceed from fear or rage being excited amongſt them. I was led to entertain this opinion, by obſerving their different ſcreams one day, which made me ſuſpect that there were more than one Queen in the hive. And as I wiſhed to have one or two of them to enable me to cauſe ſome out-laying hives ſwarm, I drove all the bees out of that hive. One Queen went along with them; but I ſtill perceived other two Queens, beſides three royal cells ſealed up. I ſtill heard the uſual quick cry of the Queen; and, upon attentively obſerving their motions;

in the hive, the emigration of a ſwarm may be depended upon, within a day or two at moſt, if the weather holds tolerably good. The firſt night that theſe ſounds are obſervable, they are low, and not very frequent, nor even the next day; but, on the ſecond night, they become louder and more frequent, in ſo much that they may ſometimes be diſtinguiſhed at the diſtance of ſome yards from the hive. Next day, if the weather be favourable, a ſwarm may be depended upon. " It is delightful, (ſays Mr THORLEY) to hear thoſe peculiar and " muſical ſounds or notes, being an eight or " chord, which is truly harmonious." They are ſcarcely ever heard before a firſt ſwarm goes off; I believe not once in ſixty caſes. The reaſon, I ſuppoſe, is, that they have in general, only one Queen reared to go off with the firſt ſwarm; and ſometimes, when tempted by very fine weather, even the old Queen will go off with the firſt colony, before the young

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tions, I ſaw them going to the royal cells, and tear at them with great fury, ſcreaming and roaring ſeemingly with great indignation:—a phænomenon, which I could only account for, upon the principle of their entertaining a jealouſy leſt their rivals in the cell ſhould come forward, and ſtand in competitition with them.

young princeſs comes out of the royal cell.* Whereas, before the ſecond or third emigration takes place, they will ſometimes have two or three Queens, and as many royal cells, in their hive; one of which may be taken to ſupply any hive that needs them.

Often have I ſeen a young Queen take an airing. For inſtance, in Summer 1790, I had a hive that had no Queen in it, but a pregnant royal cell, which had been ſeven days ſealed up; on which account, I expected that a

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* The Queens are generally bred in ſwarming time, as may be obſerved by turning up a hive at that period, when the royal cells may be perceived on the edges or ſides of the combs, although ſometimes they hang from the middle. Theſe cells are of an oblong circular form, of conſiderable thickneſs, and in appearance rather clumſy. One of them will weigh as much as four or five ſcore of common cells. When half made, they are not unlike the lower part of an acorn, turned upſide down; they gradually lengthen, and, when finiſhed and ſealed up, are about an inch in length, and would reſemble the end of one's little finger, if it wanted the nail. In ſwarming time, there will ſometimes be from one to ſix of theſe royal cells; though commonly there are not above two or three. They all hang perpendicularly, with their open ends pointing downwards to the ſtool. After the young Queens are hatched, theſe cells are ſometimes removed by the bees, and ſometimes allowed to remain; but I never ſaw an egg laid in an old cell to be a Queen; for the bees always build a new cell when they want a young Queen.

Queen would ſoon emerge out of the cell. And, as I was anxious to ſee what appearance ſhe made the moment of her birth, I turned up the hive every hour, and luckily hit the time that ſhe was opening the cell for herſelf, when I ſaw her come out of it, and creep about pretty well. Two days thereafter, I ſaw her come to the entry of the hive, and fly off and take an airing. She returned within about ten minutes thereafter, and went back into the hive, where the bees received her with joy. I have alſo ſeen many other young Queens do the ſame on the ſecond or third day of their age. Perhaps old ones may do ſo too; but I think this happens very ſeldom, as they are large and heavy, and conſequently may be afraid to truſt themſelves to their wings. No doubt, the old Queens can fly when they pleaſe, although, like many old people, they are not very fond of much travel.

It will ſometimes happen, in an apiary where there is a conſiderable number of bee-hives, that two ſwarms will go together in the time of ſwarming, when they chance to come out of their mother hives nearly about the ſame time. When one ſwarm is nearly ſettled on a buſh, hedge, or any other place, and another begins to come off from the mother hive, the muſic of the former invites the latter to join them. In ſuch circumſtances, therefore, the moſt effectual method to prevent the junction of the two ſwarms, is to cover the firſt ſwarm completely with a large ſheet, which will prevent the other ſwarm from hearing their melody. But if the firſt ſwarm be got into a hive, or nearly all entered, it ſhould be carried into a houſe, and kept there for ſome little time, till the ſecond ſwarm be fairly ſettled ſomewhere; after which the hive ſhould be brought back to its former ſituation. But when both ſwarms are ſmall, or but of a medium ſize, if they unite voluntarily and peaceably together, as they generally do in ſuch caſes, their junction will be rather an advantage than a loſs: For it is certain, that 16,000 bees in one hive will collect more honey and wax than the ſame number of bees lodged in two different hives could poſſibly do*.

CHAP.

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* This can be eaſily accounted for. In every hive there is a certain number of bees appointed to hatch the young, and to defend the hive from robbers, &c. Now, ſuppoſing that each hive requires 2,000 bees to be daily occupied in theſe employments, then it follows, that 16,000 bees, lodged in TWO different hives, muſt devote 4,000 of their number to theſe objects, and leave

CHAP. XXI.

OF THE ARTIFICIAL SWARMING OF BEES.

ALTHOUGH, in moſt caſes, bees are beſt directed by natural inſtinct, and on that account I

leave only 12,000 at work in both hives, whereas, the ſame number of bees in ONE hive, requiring only 2,000 to be devoted to theſe employments, will allow 14,000 to be conſtantly employed in the fields, and of courſe one ſeventh part more honey and wax may be produced in the courſe of the ſeaſon. There are alſo other advantages ariſing from ſuch a junction of ſmall ſwarms: They require, for inſtance, only one place in the garden; being more in number; they afford more heat to bring forward the young, and they are more able to defend the hive from robbers, &c. &c.

And here it may be both uſeful and entertaining, to take notice of the various weights and numbers of different ſwarms. "It "has been found, (ſays BUTLER,) that a larger number than "40 or 50,000 will not thrive together in one hive. Swarms "often amount to 30,000; a large ſwarm may weigh eight "pounds, and gradually leſs to one pound; conſequently a "very good one weighs five or ſix pounds, a moderate one "four pounds. No ſwarms leſs than this ſhould be kept, but "united with others." If we conſider that about 5000 bees weigh a pound, a ſwarm weighing four pounds, will have near about 20,000 bees, which will compoſe a very good ſwarm. But I am of opinion, that a ſwarm, conſiſting of 15,000 bees, will do very well in a ſingle hive, if the ſeaſon is not too far advanced; and, indeed, the more numerous the ſwarm is, ſo much the better. I myſelf have had above 30,000 bees in one ſwarm.

I am always beſt pleaſed with natural ſwarms, yet it may be obſerved of them, as well as of moſt other animals, intended for the uſe or benefit of man, that conſiderable room is left for human art and ingenuity to aſſiſt them. Thus, for inſtance, they are provided by human art with much more convenient habitations, than they could either rear or diſcover by their own inſtinct: For, without our aid, if no ruinous houſe or hollow tree were near, a young ſwarm might hang on a buſh, till they were either totally deſtroyed by wind, or drowned by rain. Artificial ſwarming, therefore, when a natural ſwarm (which is always preferable,) cannot be obtained, is ſometimes a neceſſary and uſeful part of bee huſbandry; and will, indeed, turn out ultimately to our own advantage, as will appear from what follows.

Before proceeding farther, however, with any directions on this ſubject, it is proper to caution the reader, that although artificial ſwarming is very profitable, when properly performed by an experienced bee-maſter, yet it always has been, and ever will be, very deſtructive to bees, if performed by unſkilful perſons: and, indeed, all new beginners may be almoſt certain of ruining ſome hives in their firſt attempts. But, by carefully obſerving the following directions, the moſt inexperienced bee-maſter may ſoon come to the practical knowledge of the art, and thereby avoid ſuch blunders as would prove deſtructive to his bees.

CASE I, Sometimes, when two ſwarms meet, a dreadful battle enſues, on account of there being two Queens among them. Each party ſeems determined to defend their own Queen and mother at the riſk of their lives. Their fury generally laſts till one of the Queens is ſlain, after which a peace commonly takes place, and the two bands unite harmoniouſly in one community*.

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* In theſe conflicts, it is aſtoniſhing to ſee what dreadful havock they make in a very ſhort time. In my younger years, I have ſeen above 1000 of theſe brave winged ſoldiers lying weltering in their gore, within the ſpace of ten minutes. The Queen of one or both ſwarms is often ſeized inſtantaneouſly, and murdered. On ſuch occaſions, I have ſeen above an hundred bees, all wrapt together in a cluſter, of the ſize of a ſmall apple, and ſo firmly compacted together around the body of a Queen, that it was with the utmoſt difficulty I could ſeparate them from her. Moſt writers are of opinion, that the bees, which thus cluſter round a Queen, are her enemies, and that their being ſo cloſely compacted together about her proceeds from the keen enmity of

But, if they do not unite in a friendly manner, there is not a moment to be loſt. The hive muſt be inſtantly turned up, and the bees driven into four or five different hives. Every cluſter of them muſt be ſearched for the Queen, who, when caught, muſt be ſeparated from all the other bees, whether friends or foes, as, at ſuch a time, it is impoſſible to diſtinguiſh the one from the other. And, while ſhe is kept cloſe priſoner, the bees may be frightened from farther fighting; and even gradually pacified, by rapping on the hives, and thus driven out of one hive into another. If this attempt does not ſucceed to bring the bees to a good underſtanding with each other, cold water may be ſprinkled on them in the hives to cool their courage; or they may be taken into a room, as directed, page 142, and when, by their being thus toſſed and tumbled about, (all due care being taken, however, not

of each to be firſt at her with his dagger. It is, indeed, beyond a doubt, that Queens are often ſurrounded in this manner by their enemies, who frequently kill them very quickly. But I am of opinion, that they are often likewiſe encompaſſed by their friends in a ſimilar manner, whoſe loyal zeal for their ſovereign mother leads them thus to form an impregnable phalanx around her with their bodies, to protect her perſon from the rage of her moſt inveterate foes.

to hurt them) their ſpirits are brought low, they may be put into two different hives, and a Queen offered to each. To try their temper, however, a ſpecimen of the bees may be firſt introduced to the Queen, and if they treat her with mildneſs, ſhe may then be introduced to the whole ſwarm. But, if they appear to be ſtill in bad humour, the Queen ſhould be kept back till they become more pacific, which they will quickly do; for as ſoon as they get leiſure to think, they will miſs their Queen, and make all poſſible enquiry after her, running up and down the hive with the utmoſt impatience and anxiety, in ſearch of their ſovereign mother; and, when they cannot diſcover her any where, they will conclude that ſhe has periſhed during the tumult, and moſt of them will creep out of the hive in deſpair, and crawl about on the ground till they die; their caſe being quite deſperate, as they have not an egg to raiſe another Queen from. Some will perhaps attempt to fly home, hoping to find their mother there; and others will try if they can gain admittance into any other hive. This is the critical moment to preſent a Queen to them. As ſoon as a few of them diſcover her, they will ſurround her with the greateſt pleaſure, and ſing aloud for joy. The reſt, hearing the joyful news, will all crowd around her, and be ready to ſuffocate her in their extacy. She ſhould then be placed on the ſtool, as in other caſes; but if, during the conflict, one or both Queens have been killed, the bees may either be reſtored to their original hives, or put into any others where they ſhall be moſt favourably received.

In this laſt ſpring, (1795,) having two hives, that had but few bees in each, I put the bees of the one hive into the other; ſuſpecting, that as they had both bred ſlowly, there might be a defect in the health of one or both of their Queens; and hoping that, by putting them together, the bees would probably hold a conſultation, which of the two Queens was moſt healthy, and, after electing her, kill or baniſh the other, as they thought proper. The common bees of both hives at once united kindly and ſeemed happy; but, upon turning up the hive within 20 minutes after, to ſee if all was well, I perceived a few bees cluſtered together, which, however, did not greatly ſurpriſe me, as I thought the conjoined republics had already decided, which Queen ſhould remain in the hive, and that theſe bees were leading the rejected Queen to exile or execution. But, upon a more cloſe inſpection, I obſerved the two Queens ſtruggling together with the utmoſt fury, and darting the moſt deadly blows at each other. Being afraid of loſing both, and thereby ruining the united hive, by their mutually killing each other, which muſt have been the caſe, had one of them thruſt her ſting into the other's body and left it, as ſometimes happens, though rarely *, among the common bees in ſuch conflicts, I ſeparated them, and kept them aſunder, though they ſtill ran with great fury in ſearch of each other along the table §. I then took

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* Inſtances of this do not happen above once, perhaps, in fifty times; although the fact is certain, that they ſometimes kill themſelves, by leaving their ſtings in the bodies of their opponents.

§ The above-mentioned battle, between the two Queen Bees, reminded me, at the time, of thoſe lines in the old ſong of Chevy-Chace; where the brave DOUGLAS is repreſented as ſaying,

" But truſt me, PIERCY, pity it were,
" And great offence to kill
" Any of theſe, our harmleſs men,
" For they have done no ill.

" Let you and I, the battle try,
" And ſet our men aſide,"
" Then c—ſt be he, (quoth Earl PIERCY,)
" By whom it is denied."

took the one that appeared to be the boldeſt, and put her again into the hive, where ſhe was kindly received by the bees, and put the other Queen into another hive, to be dealt with, as the bees might incline, as I had no other uſe for her at that ſeaſon.

Let not my readers, from this account, ſuppoſe, that the common bees are a race of cowards, who will ſtand regardleſs and indifferent, while their ſovereigns or mothers are in danger. On the contrary, they are a ſet of brave and *patriotic* warriors, who will riſk their lives in defence of their hive, their property, or their ſovereign mother. But, when a *duel* takes place between two Queen bees, they commonly, nay almoſt always, diſpatch one of the Queens themſelves.

Case II. If the rays of the ſun have been intercepted by a cloud, or a ſhower of rain has occurred in the time of ſwarming, the ſmallneſs of the ſwarm may be aſcribed to theſe circumſtances having prevented the half of the young colony from leaving the mother hive. In this caſe, let the ſwarm be placed where the original hive ſtood, for about a quarter of an hour, in which time, the bees that are returning from the fields, will ſoon make the ſwarm large enough, and then the ſwarm ſhould be removed to about a mile diſtance, to prevent the bees from going back to the old ſtock again.*

CASE III. When a perſon has a ſmall ſwarm, whether it be a firſt, ſecond or third one, and at the ſame time a lying-out hive, that has been long in ſwarming, he ſhould drive all the bees out of the lying-out hive, into an empty one, (ſee the method, page 138) and ſet down the bees in the ſame ſpot where they ſtood formerly, which will make a fine large artificial ſwarm, as ſuch a hive would have abundance of bees; after which, let the ſmall ſwarm be put into the old hive, where they will hatch out all the young, and make a good hive; and let the old hive be placed on the ſame ſpot where the ſmall ſwarm ſtood.

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* When bees come naturally off in a ſwarm, they take a view of the place where they ſettle, and never think of going back to their mother hive; but, when they are ſeparated from their mother hive by driving, or when the hive is ſhifted from where it formerly ſtood, they are inſenſible of the change of their ſituation, and always fly back to their former ſtation; for which reaſon, the bee-maſter ſhould always remove every artificial ſwarm, or re-inforced hive, to ſome conſiderable diſtance, otherwiſe a number of the bees will go back again.

Case IV. If there are two ſmall ſwarms, but no hives, that have bees ſufficient either to exchange with, or re-inforce them, let them be united; for, in ſuch caſes, two ſwarms, conjoined into one, will proſper better, and turn out more profitable, than three ſmall ones kept ſeparate. See page 167.

Case V. Suppoſe one drive all the bees out of a hive, and thereby make an artificial ſwarm, if the old hive has a royal cell in it, by introducing about 5000 common bees into it, they will hatch out the young Queen, with all the eggs and nymphs (or young bees) in the cells, and render it a flouriſhing hive. The method of introducing the common bees, is as follows: Let a ſtrong lying-out hive be removed from its uſual ſituation, about 10 A. M. and place the hive that has no bees on the ſpot where it ſtood. The bees, on their return from the fields, will enter it, and will no doubt be ſurprized at the ſudden revolution, having left their hive full of their brethren, not one of whom is now to be ſeen; but, finding plenty of honey, and abundance of eggs, they will make the beſt of their misfortune, and ſpeedily repleniſh the hive, by rearing up the young bees, and working with as much alacrity, if not more, than when they were in their original hive. It will be neceſſary, however, in this operation, to remove the original hive to another apiary, (See p. 176.)

Case VI. When one has a hive that has long lien out, and ſtill ſhows no appearance of ſwarming, if a ſwarm is wiſhed for, all the bees may be driven out, as directed, page 138. A ſwarm may thus be obtained, which, if the weather anſwers, will not fail to ſucceed. The old hive may be placed below ſome other hive, the bees whereof will hatch out the young bees, and in autumn the honey may be taken out of it, and all the bees put into the upper hive.

Case VII. I have often formerly taken all the bees out of a hive to make an artificial ſwarm, and put into it a conſiderable number of common bees, in order to hatch out the young brood in the combs, build a royal cell, and rear a Queen for themſelves. This practice I found in general anſwered very well, as the bees hardly ever failed to rear a Queen. The only objection againſt it ariſes from this conſideration, that from the time the old Queen is taken away, till the young one is fit to lay eggs, a period of twenty five days elapſes, during which time there is not a ſingle egg laid in the hive. And when it is farther conſidered, that there muſt be an additional loſs of other 18 days, before the eggs can be bees for any uſe, it is evident, that the beſt part of the honey ſeaſon will be over, and conſequently that by autumn, the hive will be greatly deficient in bees. For theſe reaſons I have now almoſt entirely given up the practice, though I have ſometimes had hives that proſpered very well under it. And, indeed, if I intended to kill a hive of bees in autumn, I would rather prefer the taking away their Queen from them about the end of July, and leaving a great number of common bees in the hive, which, as they would have few bees to nurſe up, would collect a greater quantity of honey in that period, than if they had a Queen in the hive daily laying eggs for them, which would employ a good number of the bees, both to hatch and nurſe up the young, and thereby, the fewer would be employed in collecting honey.

Case VIII. If a ſwarm ſhould come off, which the mother hive cannot afford to want without great injury, it ought to be returned again into the old hive, in this manner: Take the Queen from the new ſwarm and confine her in a box; and then turn up the hive containing the new ſwarm, and place it before the entry of the old ſtock which the bees came from, in ſuch a manner that the bees in it may run from it into the entry of the old hive again; which they will ſoon cheerfully do, eſpecially as their Queen was taken from them. This operation is ſo eaſy that it may almoſt be performed by a child.

Case IX. When the ſummer is far advanced, and it may be rather late for ſwarming, an eek, placed below a ſtrong hive, will give the bees more room to work, and may prevent a late ſwarm from coming off, which, in general, turns out more loſs than advantage to the Bee-maſter.

CHAP. XXII.

OF THE KILLING OF DRONES.

It is a good ſign that a hive is thriving, and a certain proof that there is a Queen in it, when the working bees kill their drones early: for in thoſe hives that have loſt their Queen, the bees become ſo careleſs both about their honey and their hive, that they permit the drones to live till November or December. And perhaps there is no ſmall wiſdom in this, for the bees, knowing that they cannot breed any more, are probably ſenſible, that they will gain more by the additional heat of the drones preſerving them from the ſeverity of the winter, than they will loſe by the expence of maintaining them; and conſequently lengthen out their own lives, as well as thoſe of the drones.

This leads me to think, that the drones are not ſo ſhort-lived as is generally believed. If the working bees did not kill them in the end of ſummer and beginning of harveſt, but left them to die of old age, they might perhaps live in a good warm hive till ſpring. The bees ſeldom begin to kill the drones, till the honey ſeaſon be nearly over. When, therefore, the maſſacre of the drones begins, one may know that, in general, the honey is becoming rather ſcarce in their neighbourhood; although it is not an infallible ſign; for the bees of ſome hives kill their drones ſooner than thoſe of others, ſtanding in the ſame apiary. In hives ſituated near early paſtures, when the flowers are moſtly gone, the bees will kill their drones in the end of July. In later ſituations, they are permited to live till Auguſt. During this laſt autumn, (1794,) I ſaw many excellent thriving hives, ſituated among good heath, whoſe drones were not extirpated till about the end of September.

As the working bees, when the flowers become ſcarce, kill the drones, and thus ſhow us plainly, that they are now become uſeleſs in the hive; ſo I agree with almoſt every writer on this ſubject, that it is proper to aſſiſt the bees in extirpating them. The manner in which the working bees kill the drones is this. They not only ſting them, but pull and bite them with their teeth. It is incredible what havock they will make of them in a ſingle day, as I have often been convinced, by obſerving great numbers of them lying dead before the door of the hive ‡. They alſo ſometimes

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‡ When the bees once fall a-killing the drones, it is amazing to ſee how intent they are on the buſineſs.—They not only diſpatch the old ones, but they alſo tear out and deſtroy the young drone-maggots in the cells,—eſpecially in bad weather. I have indeed ſeen them, even before ſwarming time, when it had been wet weather for five or ſix days, become ſo diſconſolate, ſo diſcouraged, and even deſperate, (thinking, perhaps, that the weather would never mend,) that they threw out, before the entry of their hive, ſome ſcores of white young drones; but, on the return of fair weather,—inſtead of tearing out and killing the remainder of this unfortunate race, the Queen immediately

times kill them in a more tedious and lingering, but no leſs effectual way, by baniſhing them from their granaries of honey; upon which the drones retreat in great numbers to the ſtool and the under edges of the hive; and ſometimes, though rarely, I have even ſeen them come to the outſide of the hive, in ſmall cluſters. When thus exiled, they ſoon become very dull and lifeleſs, and at laſt die for want of food. Upon lifting up a hive from the ſtool, I have obſerved numbers of them ſitting cloſe upon it, with hardly three or four common bees among them, and on ſuch occaſions I have trode to death forty, or more of them, at once, with my foot. But, without lifting the hive,

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diately laid freſh eggs, in the drone cells, and the common bees again carefully reared them up to maturity.

Whenever, therefore, the young drones are torn out of their cells before ſwarming time, in bad weather, the bees ought immediately to be fed, which will prevent them from deſpairing, and ſave the lives of the young drones.

It is alſo neceſſary to mention, that if the weather be bad for two or three days, after a new ſwarm is introduced into an empty hive, the bees ſhould be fed and encouraged by a little honey; as, in ſuch caſes, I have frequently ſeen them, when long confined, not only ſoon diſcouraged, but ſome of them die; whereas, by being carefully fed, they are not only kept in good ſpirits, but will, with greater chearfulneſs, embrace the firſt favourable moment for reſuming their labours.

hive, any perſon may eaſily aſſiſt the working bees to kill the drones, (as ſoon as the bees ſhow us the example), by ſitting down at the ſide of the hive the firſt good day thereafter, about eleven o'clock, and cruſhing them one by one, as they come out of the hive, by preſſing them to the ſtool with his fore finger. In this manner, an hundred drones may be killed in a very ſhort time. I generally kill the moſt of the drones in my hives when I have leiſure; although there is no abſolute neceſſity for doing it, as the working bees will perform the taſk themſelves in due time. But it certainly occaſions a conſiderable ſaving of honey, and I am inclined to think, that no harm can ariſe from it, eſpecially in thoſe hives whoſe honey is to be taken in Autumn. However, when there are very few drones in a hive I kill none of them; but when they are very numerous, I often kill ſome hundreds; at leaſt two thirds of them, and leave the working bees to kill the reſt at their leiſure.

CHAP. XXIII.

ADVANTAGES OF CHANGING THE SITUATION OF BEE-HIVES TO BETTER PASTURE.

ABOUT Lammas, thoſe who live in ſituations where the vegetation is early over, eſpecially if poſſeſſed of a large number of hives, ought to remove their bees to the neighbourhood of heath grounds, if they ſhould even be ſix or eight miles diſtant, and allow them to continue in that ſituation till the heath gives over bloſſoming. This meaſure I would earneſtly recommend, as the bees, after having had all the advantage of their early ſituations, will work as late in the ſeaſon, as thoſe in the lateſt ſituations. I have often ſeen a hive, by being placed nigh heath, become ten, twelve, or fifteen pounds heavier, in the month of Auguſt; ‡ whereas, if it had remained in its original

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‡ I can aſſure my readers, that, in the middle of September 1792, I have ſeen bees in ſuch ſituations, filling their hives with combs and honey, as plentifully and as expeditiouſly, as

ginal early ſituation, it would probably have become every day lighter after Lammas. The only riſk in this caſe is, that if the weather turn out bad in Auguſt, the bee-maſter will loſe all his trouble; but contingencies of this kind happen in every other buſineſs in which mankind engage, which nevertheleſs do not deter us from adventuring.

When bees are placed in a new ſituation, they ſhould not be permitted to come out of their hives, for the firſt time, in cold weather; for, finding themſelves in a ſtrange place, they will fly about and take a view of the neighbourhood; and ſome of them alighting, and reſting on the cold ground, the cold benumbs them, and they periſh, unleſs ſpeedily recovered by the heat of the ſun. When I remove a hive to a new ſtation, I keep them cloſe priſoners till the firſt fine day, when, about 10 o'clock A. M.—the time they are moſt impatient

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as if it had been the middle of June. In the beginning of September, that year, I purchaſed for a gentleman in Northumberland, a conſiderable number of hives, that were only about half full of combs when placed in his apiary; but the heath in his grounds being extremely rich and in full bloſſom, the bees were ſo expeditious in their labours, that they filled the hives completely with both combs and honey, within a week thereafte.

to get out, I place a feeding comb before their entry, which I at the ſame time open, and the bees come out in great numbers, and fly about with great alacrity, making their uſual chearful muſic in the air, for two or three minutes, and taking a view of their new ſituation. In the mean time, ſome of them diſcover the feeding comb, and entertain themſelves with it, while the flying bees alight at the entry, and make their uſual muſic for joy; which invites the ſtraggling bees to return home, ſo that, perhaps, ſcarce a ſingle bee of the whole hive will have miſſed its way; whereas, if they are allowed to go out ſingly, eſpecially in cold weather, a conſiderable number of bees will be loſt, for want of ſuch muſic in the air, or at the entry of the hive, to call them home.

In the removal of bees in general, it is better and ſafer, to remove a hive to the diſtance of a mile or ſo, than to a nearer ſituation; for, when a hive is removed out of an apiary, where there are a conſiderable number of hives, to the diſtance of about a quarter of a mile or ſo; and eſcially, if the bees are allowed to come gradually out of their hives, they will fly to their old place of abode; but not finding their own hive, they will fly about in ſearch of it, in a diſconſolate manner, for hours perhaps; and after being repeatedly diſappointed, they will at laſt try thoſe hives that ſtand neareſt the place where their own hive ſtood, to ſee if the inhabitants will admit them, as ſo many *deſtitute orphans*, into their community. When they thus come in a humble ſupplicating manner, they are ſeldom refuſed permiſſion to enter, and aſſociate with the reſt of the hive, as fellow-labourers. Being favourably received, they are ever after treated, not only as *allies*, but as *brethren* of the ſame family, and live in the greateſt harmony with them ever after.

Similar meaſures ought to be adopted in all caſes of uniting and re-inforcing whatever. If any perſon ſhould take a hive out of his own apiary, and drive all the bees out of it, they would fly about in the ſame manner, and at laſt enter into thoſe hives, that would admit them kindly. In ſuch caſes, however, the firſt ambaſſadors, (like thoſe of King DAVID to HANUN, the Ammonite,) may, perhaps, be miſtaken for SPIES, and treated accordingly. But it will ſometimes happen, that the bee-maſter is in ſuch circumſtances, that he will be obliged to remove a hive a quarter of a mile from other bees. In this caſe, he muſt keep the bees priſoners for ſome time, as above-mentioned, eſpecially if the hives in the original appiaries be ſhut or covered over, till the bees of the removed one fly about for an hour or ſo. Thus, the loſs will be the leſs, as perhaps ſome of the ſtraggling bees may find their way back to their own brethren again. But even although an hundred, or two hundred bees ſhould fly off in this manner, a ſtrong hive will ſuffer little by the want of them.

CHAP. XXIV.

OF BEE-BREAD AND WAX.

THE ſubſtance, commonly called BEE-BREAD, is to be found at the bottom of many of the cells, and is frequently covered over with honey. The bees carry it home in loads upon their legs, or rather their thighs. It is generally of a yellow colour, but often takes its colour from the flowers from which it is collected.

Various conjectures have been made by different authors reſpecting its uſe. Some alledge that the bees eat it; hence the name, *Bee-bread.* Others ſuppoſe, that, after being taken into their ſtomachs, it is converted by ſome peculiar action of their internal juices into wax, of which every body knows their combs are made. But an objection to this hypotheſis, ariſes from the conſideration, that the bees, when firſt put into an empty hive, carry little or none of this ſtuff on their legs for ſome time, till a great number of combs are made; and that after the combs are completed, (which they generally are within two or three weeks after the ſwarm have taken poſſeſſion of the hive,) the bees ſtill continue to carry in this ſtuff during the whole working ſeaſon. To this, however, it may be replied, that perhaps, as they have no cells to put it into at that time, they carry it home in their bellies, where it probably undergoes a ſpeedy change in paſſing through their bodies, and may thereby be converted into perfect wax, with which they manufacture their combs.

There is another claſs of authors, who ſuppoſe that the bee-bread is uſed by the old bees to feed the young ones in the cells, by the mouth, as pigeons feed their young ones. To this it may be objected, that the young bees ſurely cannot make uſe of all the bee-bread, which the old bees are almoſt conſtantly carrying into the hive when they are at work. Perhaps both theſe laſt hypotheſes may be true; as it may not only ſerve to feed the young bees, but alſo, by paſſing through the bodies of the old ones, may be converted into wax; with which bees not only build their combs, when a ſwarm is newly put into a hive, but alſo ſeal up both their young in the cells, and their honey in the combs. If this ſuppoſition be true, then the conſumption of bee-bread, through the courſe of the year, but eſpecially during the honey and breeding ſeaſons, muſt be very great; and therefore we need not be ſurprized at the quantities imported by the working bees. But, whatever truth may be in either or both of theſe theories, I am certain of one thing, that the bees do not live on bee-bread alone; for they will die of hunger, although there be plenty of it in the hive, if there be no honey in it; whereas, when they have abundance of honey, they will live without bee-bread, at leaſt for many weeks. REAU-

MUR, however, ſays, that it is abſolutely neceſſary for food to bees.

For my part, I have always obſerved the bees moſt buſily employed in carrying in this ſtuff while the young bees are breeding; but when they want a Queen, and have no eggs to rear another, they immediately give over carrying it into the hive, thinking, (as it would ſeem,) that as they have no young bees to feed or ſeal up in the cells, it would be an idle buſineſs to bring any more of it home, eſpecially as they do not make much uſe of it themſelves, and have more already in the hive than they will ſtand in need of, for their own uſe. MR THORLEY alledges, that the bees carry the wax home from the fields in fine ſmall ſcales‡ between the folds of their bodies. He ſays, that "For ſeveral ſeaſons, after I became a Bee-maſter, I was very deſirous and diligent to find "out how, or where, they brought home their "wax, well knowing that groſs matter to be of "a very contrary nature, and applied to ſome

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‡ Theſe ſcales are well known by bee-maſters, and ſomewhat reſemble ſmall ſalt at a diſtance, but, upon a nearer inſpection, they are more like the ſcales of very ſmall fiſh, being thin, ſmall, round and white. Their ſubſtance is nothing but pure wax.

" other uſe, but was not able for a conſiderable
" time, to enter into the ſecret.

" At laſt, viewing a hive of bees very buſy
" at labour, I obſerved one bee among the reſt,
" as ſhe fixed upon the alighting place, of an
" unuſual appearance; upon which I ſeized
" her directly, before ſhe had time to enter the
" hive; where, with a very ſenſible pleaſure, I
" found what I had (till then) been in vain
" ſearching for. Upon the belly of this bee,
" within the plaits, were fixed no leſs than ſix
" pieces of ſolid wax, perfectly white and tranſparent like gum; three upon one ſide, and
" three upon the other, appearing to the eye equal in bulk and gravity; ſo that the body
" of the bee ſeemed duly poiſed, and the flight
" not in the leaſt obſtructed by any inequalities.

" Here have I found it at other times, and
" once I took away eight pieces together, and I
" knew that it was wax, and nothing elſe. Will
" not this paſs for demonſtration?"

That Mr THORLEY, and probably ſome others, have ſeen bees carrying ſuch white ſcales, or pieces of ſolid wax, on their bodies, once or twice perhaps in their lives, I will not diſpute. I myſelf have ſeen the ſame phænomenon, once, or at moſt twice, during an experience of thirty years. But it certainly would be abſurd to infer from theſe rare caſes, that all the wax, which the combs are made of, is carried into the hive in this manner. The contrary inference muſt be drawn, were it from nothing elſe but the conſideration, that theſe white ſcales have been ſo very ſeldom obſerved. It is alſo well known, that when a young ſwarm is newly ſet down, within a ſhort time thereafter, ſmall ſcales of fine white wax will be ſeen on the ſtool; which is a certain proof that the bees are beginning to build combs: and perhaps a few of the bees may pick up ſome of theſe ſcales, to prevent them from being loſt. But, if every bee, that is employed in carrying wax for building the combs, either within or on the outſide of her body, could be obſerved, we would ſee thouſands thus loaded every day after a young ſwarm is firſt ſet down, inſtead of obſerving only one or two ſolitary inſtances in the courſe of twenty or thirty years.

If a natural or artificial ſwarm is confined 24 hours in a hive, after it is newly put into it, the bees will be found buſily employed in making combs. From this it may be argued, that the bees, having eaten a quantity of bee bread on purpoſe, before they left their own hive, and having it ſtill in their ſtomachs; had made wax of it to erect the combs.

Of this fact any perſon may convince himſelf, by driving the bees out of any hive into an empty one, and confining them 24 hours; after which, upon examining the hive attentively, he will find a piece of comb, perhaps ſix or eight inches long, beſides ſeveral hundreds of ſcales lying on the ſtool. It is evident, then, that theſe ſcales could not be brought from the field, as Mr THORLEY ſuppoſes, ſeeing the bees were never out of the hive; and, it is farther to be obſerved, that when they are at full liberty to work in the fields, and when a young ſwarm is moſt buſily employed in rearing combs, nothing can be ſeen on their bodies of theſe ſcales, or any thing elſe.

I have ſometimes, indeed, been inclined to think, that the wax might be an excreſcence, exudation, or production from the bodies of the bees; and that, as the Queen-bee can lay eggs when ſhe pleaſes, if need require, ſo the working bees can produce wax from the ſubſtance of their own bodies. If this conjecture be right, it will follow of courſe, that all the food which the bees take, contributes to the formation of wax, in the ſame manner as all the food which a cow eats contributes to the production of milk: or, (to adopt a more near ſimile from the inſect tribe,) as all the food which a ſpider takes, contributes not only to the nouriſhment of the animal, but to the production of the ſubſtance of the cob-web from its body. Numberleſs other analogies in nature might be adduced in favour of the probability of this theory. The ſilk, for inſtance, produced from the body of the ſilk worm, is a ſubſtance as different from that of the animal itſelf, or of the mulberry leaf it feeds on, as wax is from that of the body of the bee, or of the honey or flower ſhe ſucks. And the excreſcence produced in the human ear, which alſo goes by the name of *wax*, is certainly a ſubſtance as different from that of the body which produces it, as either the one or the other. Upon the whole, until I meet with a more probable theory, ſupported by facts, I muſt give it as my humble opinion, that the wax is either produced from the bodies of the bees alone, or rather that the bees can ſpeedily convert what they bring from the flowers into it, and therewith build their combs, and ſeal up both their young and their honey.

CHAP. XXV.

OF THE HONEY HARVEST.

I ONCE thought, that if we preſerve all our bees, we muſt alſo keep all our honey in the hives, to maintain them during winter and ſpring. But I am now of a different opinion; for the ſeverity of the winter not only reduces the number of bees, but ſometimes even kills whole hives, although they have large quantities of honey in them. It is, therefore, much more profitable to preſerve all the bees alive, and unite them to other hives, although we ſhould be at the expence of ſome honey to feed them during ſpring. It is indeed, probable, that every Queen is capable of laying only a certain number of eggs. Suppoſing, then, that we ſhould put 100,000 common bees in a hive, the old bees would gradually die out, and as there would be but one breeding Queen in the hive, it would ſoon have no more bees than any other hive. Indeed, experience convinces me, that there never was a hive, however large, proſperous, and numerous of inhabitants in ſummer, either naturally, or by being united, that did not gradually decreaſe againſt next ſpring, ſo as very little to exceed the moſt ordinary hives in number. It is true, indeed, that ſome ſwarms of bees, by being kept in a very large hive for ſeveral years, have had as much honey and wax, as three or four ordinary hives. But ſuch caſes only occur, either when two or three ſwarms go together in ſwarming time, or when a thriving ſwarm continues for ſome years in a large hive; and, by collecting perhaps 60lb. of honey every year, and conſuming only the half of it during winter and ſpring, thus increaſes the ſtock of honey, and the weight of the hives, at the rate of 30lb. a-year*.

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* I am quite certain, however, that a great number of bees in one capacious hive,—I ſhall ſuppoſe 30,000,—will breed amazingly; as they will have perhaps, in June or July, not under 7,000 young in the cells; for almoſt every comb in the hive at that ſeaſon, will be quite full of eggs, nymphs and young bees, all gradually coming forward. According to this calculation, allowing 18 days to paſs between the time that an egg is laid, and a complete bee produced from it, there would not be fewer than 300 eggs laid each day in the hive,—an aſtoniſhing number

Nevertheleſs it is evident, that a hive that has a great number of bees in autumn, ſtands

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ber to be all laid by one mother. Monſieur Reaumur ſays, that the Queen will lay 200 in 24 hours; but I am perſuaded, that, in ſome extraordinarily populous hives, ſhe lays near double that number. She is acknowledged by all authors to be very prolific. Swammerdane beheld in the ovarium of a Queen bee, 5100 eggs at once; and Reaumur ſays, that, "in the ſpace of "three weeks, 6000 bees are brought to perfection." Nor, indeed, is this at all incredible, when we conſider that ſome cod fiſh have had no fewer than 9,344,000 eggs in their ovarium at once.* The prolific powers of the Queen bee ſeem to depend very much on the ſtate of the hive ſhe belongs to; and I am apt to think, that the increaſe of a hive ſcarcely ever fails on her part, if ſhe be in a healthy ſtate. For, during the months of May, June, and July, all Queens breed ſurpriſingly faſt, if the weather is good, and if they have abundance of common bees to rear the young brood. When one, therefore, has a hive, that, on account of the paucity of its inhabitants, does not breed faſt, were he to add a great number of common bees to it in Summer, it would ſoon increaſe as faſt as any in his apiary.

It muſt, however, be allowed, that ſome Queens will be more fruitful than others, although a hive ſeldom ſuffers from that cauſe alone. One ſingle author alledges, that two or three Queens may be permitted to live for a ſhort time in a hive, during the middle of ſummer, and that of courſe a greater number of eggs will be laid each day, than if there were but one Queen in the hive. But I am pretty confident, that this is a miſtake; for, among the many hundreds of ſwarms, which I have driven out, I never ſaw more than one breeding Queen at a time. Indeed, perhaps, in one hive among fifty, I have obſerved two Queens,

* Nature delineated, p. 130.

a much better chance not to periſh by the ſeverity of the winter, than a hive that has not half the number of inhabitants; for which reaſon I would earneſtly recommend it to my readers, NEVER TO KILL A SINGLE WORKING BEE, at any ſeaſon of the year; but, in autumn, to unite all the bees of thoſe hives, from which the honey is taken, to thoſe that are intended to be kept as ſtock hives. This will render them fit to defend themſelves both againſt the ſeverity of the weather in winter, and againſt robbers in ſpring; and will alſo greatly forward their labours as ſoon as the working ſeaſon returns; for, as has been already obſerved, it is of the greateſt importance to have the hives always well-ſtored with bees.

The time of taking the honey out of the hives is ſometimes earlier, and ſometimes later, according to the weather, and the earlineſs or lateneſs of the flowers in the neighbourhood.

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Queens, an old and a young one; but that hive would have ſent off the young Queen with a new ſwarm probably in a day or two, as ſhe was only waiting an opportunity for that purpoſe; and it may be obſerved, that the young Queen was not then arrived at the age of laying eggs, as ſhe is about eight days old before ſhe can become a mother; and therefore I am fully perſuaded, that there are never on any occaſion two Queens in the ſame hive, laying eggs at one time.

I have known a hive of bees waſte their honey, and the hive become gradually lighter after the firſt week of Auguſt; and, at other times, in favourable weather, I have ſeen hives of bees, that were ſituated near heath, (as mentioned, page 185) continue working keenly during the whole of Auguſt, and the greater part of September, and become daily heavier. In a word, the harveſt of honey, like that of corn, is earlier or later, more plentiful or ſcarce, in different years, according to the weather and the climate, and the variety of ſeaſons and ſituations.

One general rule, however, may be laid down for the proper time to take honey. As ſoon as the flowers, in the neighbourhood of an apiary, are moſtly faded, although the bees may continue to work in favourable days, yet their families being now generally very large, they will probably conſume as much honey in one day, as they will collect in two. At this period, therefore, the prudent bee-maſter will firſt chooſe his ſtock hives, according to the directions given, page 89. He will then put a mark on every hive he has picked out for this purpoſe, and ſell or take the honey from all the reſt, whether good or bad; for the ſooner the honey is taken, it will run the more eaſily out of the combs. And, as it runs beſt in warm weather, he ſhould take the honey, that he intends to run out of the combs, immediately after the bees have nearly given over work, and unite the bees to his ſtock hives, as directed page 136, &c.

But honey, that is intended to be kept in the combs, ought not to be taken ſo ſoon, as cold weather renders the combs more fit to be handled; and as the bees are all to be kept alive, and of courſe muſt be maintained, it is of no conſequence, in point of expence, whether they are allowed to feed on the honey in the hive they are ſoon to leave, or on that of the hive to which they are to be united. Beſides, there is an additional advantage, that ariſes from their being allowed to continue in their native hive; as the longer they remain in it, the more young bees will be hatched; which both preſerves a greater number of bees, and makes the honey combs more free of the young brood; ſo that there is no harm in keeping the bees in the hives till October, when the honey is not intended to be run out of them.

When the honey of a hive is taken in Autumn, and there is a great number of young in the cells, thoſe combs which contain the young, and which may be intermingled with bee-bread, ſhould be carefully and gently placed in an eek, (ſee page 110, &c.), and a numerous hive put over it, to hatch out the young brood, and ſuck up the particles of honey remaining in the combs, and probably alſo make ſome uſe of the bee-bread. This plan is of great advantage to the bee-maſter, as the young bees, which are always the beſt, and which would otherwiſe have been totally loſt, will thus be all preſerved; beſides that very little uſe could have been made of ſuch honey in the cells, as was mixed with young bees, eggs, and bee-bread. The eek and the combs may be removed in about three or four weeks thereafter, and the hive ſet down in its former ſtation.

If the bee-maſter has not as many good hives as he wiſhes to keep for ſtock, he may ſupply himſelf, by conjoining the bees and honey of two light hives, and uniting them into one in September, as mentioned in page 47. The heavieſt hive ſhould be firſt ſelected; after which, the bees and honey ſhould be taken out of the light hives in the following manner:

The Bee-maſter muſt firſt drive as many of the bees as poſſible into an empty hive, as directed in page 138. But, at this period, and in all cold ſeaſons, bees are not ſo eaſily driven out as in warm weather; although, the taking them into a warm room, will make them run up the better. Afterwards, he ſhould take the combs carefully out, eſpecially if it be a light young hive, one by one, with his hand; and, in doing this, all the bees that are upon the combs may be gently ſwept off with a large feather, into the hive, among their brethren. Their Queen muſt then be taken away, with about 100 bees, and kept cloſe priſoners; then re-inforce any hive with the common bees that appears to have feweſt inhabitants in it, (as directed p. 136, &c.) or rather any hive that will give them the moſt favourable reception; and, as ſoon as all the bees are united and happy, the Queen, with her hundred attendants, may be introduced; and, if they judge her to be preferable to their own, (for the bees are doubtleſs the beſt judges in theſe matters) perhaps they will elect her and baniſh their own Queen. About two days thereafter, the hive intended for the ſtock may be re-inforced with the honey combs; according to the directions given in pages 110, 111, and 112.

The Bee-maſter ſhould proceed in the ſame manner with every other hive, from which he intends to take honey; and if any of his neighbours ſhould happen to be ſtill ſo prejudiced in favour of old cuſtoms, as to continue the barbarous practice of killing their bees, he may make an advantageous bargain with them, and ſave the lives of the uſeful inſects, by offering a trifle for them, which will ſurely be accepted, as the owners can otherwiſe gain nothing by them. By uniting theſe to his own hives, every hive in his apiary will be fully ſupplied with bees and honey: And being now in a proſperous ſtate, may be carefully covered over, and rendered fit to endure the winter. See page 97.

CHAP. XXVI.

OF PREPARING HONEY AND WAX.

BEFORE entering upon this neceſſary buſineſs, the bee-maſter ſhould be properly provided with a ſufficient number of utenſils, ſuch as large diſhes, jars, ſieves, knives and ſpoons. He ſhould begin while the honey is warm, as it will run from the combs the more quickly; and therefore, to preſerve the heat till the operation is over, the hive ſhould be brought into a warm room. He ſhould next take hold of the ends of the croſs ſticks in the hive with pincers, and looſen them by twiſting them round; after which they will be eaſily pulled out. The edges of the combs ſhould then be looſened with a knife from the hive all around. Upon giving the hive a gentle knock on the floor, on that ſide which is oppoſite to the broad ſide of the combs, they will fall to that ſide, and upon turning the hive, and giving it another knock on the oppoſite ſide, all the combs, which could be reached by the knife will be effectually looſened. The hive being ſtill kept on its broad ſide, the combs will all be above each other. The uppermoſt being firſt taken off, if there are any dead bees in it, they may be blown or bruſhed off. The combs ſhould then be divided into three parts. The empty combs being firſt laid aſide for wax; next the combs containing eggs or maggots; and laſtly, the moſt valuable part of the whole, the fine ſealed combs, containing the honey, ſhould be laid in a veſſel by themſelves. An aſſiſtant ſhould immediately be ordered to cut theſe laſt into thin ſlices, firſt obſerving to pare off the ſealed mouths of the cells, that the honey may run freely out. In this ſtate they ſhould be laid in ſieves, or any other veſſels that will afford a free paſſage to the honey, which will run quite clear, and the honey thus obtained ſhould be kept by itſelf, as being the pureſt and beſt.

Thoſe combs which may be filled with a mixture of live young maggots, bee-bread and honey, ſhould immediately * be put below ſtock hives, as directed page 202, &c. and the bees will ſoon ſuck up all the honey in them. When the fine combs are completely run, they ſhould be put into a pan, over a ſlow fire, and ſtirred conſtantly till they are more than milk warm; when they ſhould be put into a ſtrong canvaſs bag, and the honey ſqueezed out. This honey being of an inferior quality, may be either uſed in the family, for common uſes; or rather kept for feeding the bees. All the combs, from which it was ſqueezed, may then be ſoaked in water, and a weak kind of mead

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* All combs containing eggs and young in the cells muſt be put immediately to other hives, while they are warm; for, ſhould they remain two or three hours out of a hive, they will become chill and cool, ſo as to make them decay in the cells.

mead drawn from them; or a ſtronger mead may be taken from the combs by ſoaking them, after the fineſt of the honey is run off, without melting or ſqueezing them at all. Indeed, in warm weather, fine combs will run almoſt quite dry, without the leaſt preſſure.

My method of running honey is this: I hang up a wide riddle, with the ſliced honey combs in it, about 5 feet from the ground: About 8 or 10 inches below this, I place a ſieve, ſomewhat wider in circumference than the riddle, and, at an equal diſtance under the ſieve, a fine ſearch, proportionally wider than the ſieve, under which, a foot lower ſtill, I place one of my earthen covers, deſcribed page 98, with the bottom uppermoſt, and a ſmall hole in the top, to anſwer the purpoſe of a funnel. This laſt being properly fixed in a veſſel of a ſufficient ſize, the honey that runs into it is completely purified from all extraneous matter whatever, by running through ſo many different ſieves at one time. Thus, in a few hours, in a warm day, I can have my honey purified to the higheſt degree of fineneſs, without boiling or diluting it, or uſing any other means that would deprive it of its original genuine flavour; for any ſmall crumbs of wax, bee-bread or the like, that paſs through the riddle, are caught by the ſieve; and if any thing ſtill ſmaller ſhould paſs through the ſieve, it is intercepted by the ſearch, which permits nothing but the pureſt honey to paſs through the funnel into the receiving veſſel; and thus the whole proceſs is completed in a ſhort time. During this proceſs, the combs in the riddle may now and then be turned over with a knife, to make the honey run the more freely.

This method ſhould be adopted by all Bee-maſters, who have many hives and much honey to run. But ſuch as have but a ſmall quantity may follow the other plan, and their honey will do very well, if they only keep it free of young bees and bee-bread: for a few crumbs of wax running through the ſieve will not hurt the honey, as it will ſoon riſe to the ſurface, and can be eaſily ſkimmed off.

The combs being now entirely free of honey, the next operation neceſſary is to make wax. My method of performing this is quite ſimple. I boil the combs in a kettle, with a ſufficient quantity of water, over a ſlow fire, for about 40 minutes, during which time they are all melted, and I ſtir them about frequently all the time. I then take two or three ladlefulls, and put into a bag, ſewed together in

CHAP. XXVII.

OF THE DIFFERENT KINDS OF HONEY.

It appears that honey does not candy from cold alone, without ſome other concurring circumſtances; for among a number of hives, all equally expoſed to the ſame degree of cold, ſome will be found to have candied honey in them, while others have none. Even in the ſame hive, a comb will ſometimes be found, with honey in it, partly candied and partly liquid: And it is well known, that ſome honey will turn thick and candy, almoſt as ſoon as it is run out of the cells, ſo early as the month of Auguſt; while other honey will continue liquid till November, December, or January: And ſome very fine honey will remain till April, before it candy. From all theſe facts, it muſt be inferred, that there are other concurring circumſtances beſides cold, that co-operate with it in occaſioning honey to candy. What theſe circumſtances are, it is difficult to determine.

mine. My opinion is, that the candying of honey proceeds partly from the nature of the flowers from which it is collected, and partly from the time that it has remained in the hive. But againſt this laſt ſuppoſition an objection ariſes, from this conſideration, that the very fineſt of what is called *virgin honey*, will ſometimes candy very ſoon after it has run from the combs, and become like fine white ſugar *.

This fine white honey is collected from white clover, and alſo from ſome other flowers which yield a white juice, and it is reckoned by moſt people the fineſt of honey. But the ſpecies of honey which continues longeſt in a liquid ſtate, and is eſteemed by many connoiſſeurs the very beſt of honey, (as it undoubtedly is as good as any,) is of a ſlightly greeniſh colour, and is likewiſe collected from white flowers. When candied, it ſometimes conſiſts of fine white particles, reſembling ſmall hail, intermixed with ſome liquid honey, and is very beautiful.

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* Many authors affirm, that honey, candied in the comb, is very deſtructive to bees, and alledge, that they may as well eat poiſon; others inſiſt, that it chokes them; while a third claſs alledge, that it hurts them by bedaubing them, with many other whimſical ſuppoſitions. But theſe authors certainly have either taken their own dreams for realities, or have wrote upon truſt; which they certainly ought not, in a caſe that can be ſo eaſily decided by experiment. For let any perſon put a piece of comb into a hive, with the honey in the cells, partly candied and partly liquid, and he will find, that the bees will ſoon ſuck up all the liquid honey in the upper parts of the cells; and if the middle part of the honey be candied, they will throw it out, and thus get at the liquid honey in the under parts;—which they will chearfully feed upon, without either choking, bedaubing, or poiſoning themſelves with it, and rejoice that they have got ſo much proviſion at ſo little expence of time and labour.

Heath produces a fine high-coloured honey, which looks alſo very beautiful in the virgin comb, ſhining like gold through the pure tranſparent cells. The gentlemen and ladies about Newcaſtle are very fond of this kind of honey in the combs. When run into pots and candied, it becomes all hard and griſtly,—a ſpecies of honey which is alſo greatly eſteemed by many.

There is another kind of honey, which is collected from all the above-mentioned flowers, and which, having been kept two or three years in the hive, is therefore called *old honey.* Some of that kind of honey will be very fine taſted, and pretty griſtly when eat, but the greateſt part of it, when it is run out of the combs, becomes in a few days thereafter thick and ſmooth; and is, on that account, ſuſpected, by people who are ignorant of the nature of honey, to have been adulterated, and mixed up with butter, ſugar, flower, and the like. This miſtake prevails in many parts of the country, and it is much to be regretted; as this ſuſpicion, ſo injurious to the characters of honeſt country people, who, in reality, ſell their honey as it run from the combs, is even ſometimes entertained by perſons in the higher ranks of life, who might be expected to be better informed. For although the country dealers ſometimes ſpoil their honey, by ſqueezing out the combs, and thereby occaſioning bee-bread, eggs, &c. to mingle with it; yet in all my experience, I have never met with any honey, which I could diſcover to have been mixed with butter, ſugar or flour. Once indeed, and only once, I ſaw honey which the owner had mixed with water, but he was juſtly puniſhed for his avarice; for the honey and water, fomented by the carriage in ſuch a manner, that the upper part of it had more the appearance of barm or yeſt than of honey; and the unfortunate dealer loſt both his cargo and his character.

Some alledge, that honey may be purified by warming or boiling it in pots, &c. which occaſions it to throw up a ſcum, that is ſkimmed off. But I am perſuaded, that honey is always beſt in its natural ſtate; and that ſuch methods of refining it, inſtead of improving the honey, often communicate a bad taſte or flavour to it. I therefore uſe no other method with my honey, than to let it run freely from the combs, as above, and take particular care, that none of the eggs or bee-bread, get amongſt it. And indeed this is all the art which is required to make the very fineſt of honey ;—namely, cleanlineſs : Let it only be keep as clean as the bees kept it, and the fineſt of honey will be the produce.

CHAP. XXVIII.

OF THE VARIOUS ENEMIES OF BEES, AND HOW TO GUARD AGAINST THEM.

Of all the enemies the bees have hitherto had to encounter, MAN may juſtly be conſidered as the greateſt. For while he follows the old barbarous cuſtom of killing whole hives of that induſtrious race, for the ſake of their honey, (a cuſtom which, in many nations, has begun to yield to a more œconomical, as well as a more humane practice,) he certainly deſtroys more of theſe his faithful ſervants, annually, than any other claſs of animals whatever, or, indeed, than all the other beaſts, birds, and inſects united, ever did. Nor are thoſe prejudiced murderers of the bees, their only enemies among mankind. The predatory claſs, who ſteal either their honey, or the whole hives, prove equally deſtructive to them. But it is to be hoped, that as ſelf intereſt and humanity equally unite in exploding the practice of the murderers, ſo the effectual execution of the laws will prove a ſufficient protection from the thieves [†].

The three next greateſt enemies of the bees are, Cold, Famine, and Robbers of their own ſpecies: To which may be added, as the fourth moſt deſtructive claſs of enemies, mice. By one or other of theſe, or all of them united, hundreds of hives of bees periſh annually in Britain, while their other enemies hurt them but rarely or partially.

[†] Perhaps I can boaſt of a degree of good fortune, in this reſpect, that ſcarcely one in the kingdom can equal; for, notwithſtanding the great number of bee-hives I have had ſtanding in the midſt of muirs, and far from any houſes, I never had a ſingle hive ſtolen but one, nor ever loſt one ſingle ſwarm to my knowledge, by their flying away in ſwarming time.

Of the former, we need ſay nothing here, having already given ſufficient directions in the preceding part of this work, how to guard againſt cold, famine, robbers, and mice; and ſhall, therefore, proceed to point out ſome of the latter.

WASPS are great enemies to bees, eſpecially in warm dry years; and thoſe hives that are near plantations, where they often reſort, are the greateſt ſufferers by them. In my neighbourhood, waſps are ſeldom very troubleſome, except that ſometimes a mother waſp will appear before a hive in May, and offer to go in; but her hoarſe voice and ſtrange dreſs ſoon diſcover her to the bees, who baniſh her from their habitation. I know not if any hive in my neighbourhood was ever much hurt by waſps; but, a few miles diſtant from this, ſundry hives have been ſometimes conſiderably the worſe of them.

The beſt way to extirpate waſps is to deſtroy their Queen or mother, in ſpring, wherever ſhe can be found; for waſps, in this reſpect, as well as in ſome other particulars, reſemble bees; and therefore, when a mother waſp is killed, a whole neſt of them is in effect deſtroyed. Their neſts, however, ſhould alſo be carefully ſought out, and as many of them deſtroyed as poſſible, by burning, ſcalding, or drowning them; leſt, like the bees, the waſps ſhould alſo poſſeſs the power of raiſing a Queen mother from a common egg.

When a number of waſps attempt to enter any, hive about the end of ſummer or beginning of autumn, the entry ſhould be reduced to half an inch in length, and ſcarce as much in height, that the bees may be able to defend it; and thoſe hives that have but few bees in them ſhould be taken, and their bees united to other hives, as directed page 141, &c. But ſuch as are intended for ſtock hives, if ſeverely attacked by waſps, ſhould be removed to ſome ſituation diſtant from plantations, and kept there, till the ſeaſon of plundering, by both waſps and bees, is over. Veſſels may alſo be placed in the apiary, with honey or ſugar in them mixed with ale, which will allure and deſtroy the waſps; but in fine days theſe veſſels ſhould be removed, leſt they ſhould likewiſe allure and deſtroy the bees. Another diſadvantage alſo frequently attends this method of deſtroying the waſps; as theſe veſſels, placed in apiaries, are apt to attract all the waſps in the neighbourhood, and thus, by bringing hundreds that would not otherwiſe have come, render the remedy worſe than the diſeaſe. This ſhould, therefore, be cautiouſly avoided; and indeed, in general, this method is of no great ſervice.

The large moth, called the WAX MOTH, from its maggots feeding on the wax, is another great enemy of the bees. This animal is extremely alert at diſcovering any crevice, about the outſide of the ſkirts of the hive, to depoſit her eggs in; and when unſucceſsful in ſuch attempts, ſhe nimbly runs in at the entry, unperceived by the bees, and lays her eggs, which quickly become large white maggots, above half an inch each in length. Theſe maggots ſpin over themſelves a covering for their defence, and become very numerous in ſome hives. Their depredations diſcourage the bees ſo much, that they ſometimes deſert the hive.

For my own part, I never ſuffered the ſmalleſt loſs by theſe invaders: I never ſaw one of their maggots in any of my hives, except twice or thrice, that I obſerved a few of them in one hive; and I never heard any bee-maſter in my neighbourhood complain of them. But, about twenty miles diſtant, I once ſaw a dozen of wax moths in one hive; and the owner told me, that he had once two hives in one ſeaſon, which had as many of theſe moth maggots in them as bees; for which reaſon he burnt them both, with their bees, combs, honey, wax moths and maggots altogether. In doing this he thought he acted prudently; but, in my opinion, he would have acted a much wiſer part, if he had driven all the bees that were in them, into empty hives and made two ſwarms of them, or re-inforced weak hives, with them; and then ſmoaked the wax moths and maggots to death: after which, he might have given the bees of his other hives the combs to ſuck the honey from them, and then melted the wax. His empty hive could have ſerved another year, and thus he would have ſuffered no loſs whatever, except that of the young bees, which would have been very trifling in compariſon of loſing all. The pooreſt and weakeſt hives are moſt infeſted with wax moths, as well as with other enemies. When any ſigns of ſuch vermin appear, either without or within a hive, they ſhould be inſtantly deſtroyed.

BIRDS of different kinds are alſo enemies to bees; eſpecially in Spring, when they catch them on purpoſe to feed their young with; ſuch as the ſwallow, the ſparrow, the lark, the duck, and even the common hen. I myſelf have ſeen hens pick up bees; but they very ſeldom hurt them much. Birds, in general, however, ought to be guarded againſt by all poſſible means. A ſcare-crow placed near a hive will ſometimes frighten away the wild birds.

SPIDERS likewiſe deſtroy ſome bees by catching them in their nets and ſucking their blood; though a ſtrong bee will ſometimes break through the flimſy texture, and eſcape. Nothing is eaſier than to protect them from this enemy, by deſtroying the cob-webs as ſoon as they appear about the hives, or their ſtools or covers.

EARWIGS are alſo formidable enemies to bees; and Mr Keys ſays, that "they ſteal into "the hive at night and drag out bee after bee, "ſucking out their vitals, and leaving nothing "but their ſkins, like ſo many ſcalps or trophies "of their butchery." They breed between the ſkirts of the hive and the ſtool, where their neſts ought to be ſearched for and deſtroyed.

"ANTS, (ſays Mr WILDMAN,) ſometimes "make their neſts between the hive and the "covering, without moleſting the bees or be-"ing moleſted." Although, for my own part, I was never ſenſible of my bees receiving any injury from ants, yet I have heard ſome bee-maſters ſay, that they go into hives during the night, and ſuck the honey; and that they have ſeen hives ruined by them. To guard againſt ſuch poſſible depredations, the covers ſhould be now and then removed, in the end of Summer, and the ants deſtroyed.

WOOD-LICE are alſo hurtful to bees. When old decayed wood, which they harbour in, happens to be near a hive, either the wood ſhould be removed to a diſtance, or the wood-lice carefully ſearched for and extirpated.

BAD WEATHER, wind, rain, and the extremes of cold and heat, &c. have already been repeatedly noticed as prejudicial to bees, and may be guarded againſt by the ſituations of the apiaries, covering the hives properly, &c.

NOISE is alſo ſomewhat hurtful to bees, as it diſturbs them in their induſtrious operations. This can likewiſe be in general eaſily prevented, by placing the hives in a quiet ſituation, remote from noiſy operations, highways and the like.

To conclude,—FILTH and IMPURITY of every kind that may gather upon the ſtool, or around the outſide of the hive, or be introduced near the hive, ſo as to occaſion diſagreeable effluvia, ought to be carefully removed and guarded againſt, by keeping the hives and every thing near them perfectly ſweet and clean.

CHAP. XXIX.

CONCLUSION.

As the principal intention of this work is to ſtimulate the attention of the public towards an important object, that has been hitherto too much neglected, I ſhall conclude with a few words of advice to people of all ranks and degrees amongſt us, on the ſubject.

And, *firſt*, I would humbly adviſe all GENTLEMEN of LANDED PROPERTY, to conſider, whether they have not multitudes of mellifluous flowers growing in many places of their grounds, which might yield annually ſeveral hundred pints of honey, as well as many pounds of wax, with very little trouble or expence, but whoſe ſweets being overlooked and neglected, ſerve only to feed the caterpillars and the waſps.

In the next place, I would ſeriouſly adviſe every CLERGYMAN, whether belonging to the eſtabliſhed church, or to any other ſect or party, to keep a few bee hives in his garden, or upon his glebe. I have for ſeveral years paſt paid a clergyman's lady in my neighbourhood ſome pounds for honey and wax, which ſhe had to ſpare after her own family was ſerved. I have, in my poſſeſſion, two books on the ſubject of bees, wrote by two clergymen, one of whom had EIGHTY SIX ſwarms in one year.

Mr Wheeler likewiſe informs us, that while he was viewing the beauties of Parnaſſus, he was entertained by a clergyman with the ſweets of a repaſt of honey. "After I had diſcourſed "ſome time," ſays he †, "with the good old "Caloyer, (Prieſt) whom they eſteemed a Saint, I "was conducted into a garden well planted with "beans and peas, (this was at the end of January,) and another by it, furniſhed with four "or five hundred ſtocks of bees. The good old "Caloyer preſently went, took a ſtock of bees, "and brought me a little of delicate white honey combs, with bread and olives, and very "good

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† A Journey into Greece, by George Wheeler, Eſq; in company with Dr Spon of Lyons, p. 411.

" good wine; to which he ſet us down in his " hut, and made us a dinner, with far greater " ſatisfaction than the moſt princely banquet " in Europe could have afforded us."

That the number of our hives might be greatly increaſed, wherever there is proper paſture for bees, appears evidently from Mr Wheeler's narrative, and is confirmed by the following paſſage in the account lately publiſhed of the ſheep in Spain.

" If ſheep loved aromatic plants, it would be " one of the greateſt misfortunes that could befal the farmers in Spain. The number of " bee-hives there is incredible. I am almoſt " aſhamed to give under my hand, that I knew " a pariſh prieſt who had five thouſand hives."

GENTLEMEN FARMERS ought, therefore, by no means to neglect the culture of bees. They have almoſt as many advantages as the proprietors themſelves. The great quantities of clover, muſtard, and heath, with which their grounds in general abound, would maintain a bee-hive for every horſe and cow they have upon their grounds. And gentlemen STORE-MASTERS might keep at leaſt a couple of hives for every ſcore of ſheep they have in their ſheep-walks. Indeed, farmers of every rank will find their advantage in keeping bee-hives, in proportion to the extent of the flowers that grow upon their farms; as one ſingle acre, planted with turnips, muſtard, clover, or heath, will feed many hives. Even the meaneſt cottager, who has but a cottage and a kail-yard, might keep two or three hives, and ſow a little muſtard and turnips, or plant a few gooſeberry buſhes, on purpoſe to feed his bees. There is ſcarce a country village in the kingdom, that might not afford to keep as many bee-hives as there are dwelling houſes in it; nor a tradeſman in ſuch a village, who might not eaſily keep as many hives as he has hands employed in his buſineſs. Even ſervants might have a few hives kept as their own property, in the gardens of their parents, brothers, or friends. In ſhort, perſons of all ranks and degrees, from the KING to the cottager, might be profitably employed, or agreeably amuſed, by keeping bee-hives †.

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† I am quite certain, and ſome others have often told me, that they were of the ſame opinion, that the melodious humming of bees, when buſy at work, or ſporting in the air for their own amuſement, will have ſuch an effect upon the animal ſpirits, that, however chagrined or ruffled the temper of a perſon might be, before he takes a walk among his bees, he generally does not withdraw till the mind enjoys a perfect calm and inward tranquillity.

Let none here alledge, that theſe our induſtrious inſects are below the attention of the greateſt. Melissus, the firſt inventor of bee-hives, was a king; but perhaps we ſhould never have heard of him, if he had not paid particular attention to theſe his little ſubjects. Encouragement might alſo be given to the culture of bees, by reſpectable ſocieties, ſuch as the Board of Agriculture, the Highland Society, &c. who might advertiſe ſmall premiums, to be given to thoſe who ſhould rear the greateſt number of hives, or bring the greateſt quantity of honey and wax to the market during the ſeaſon. Perſons properly qualified might alſo be employed, either by ſocieties or individuals, to inſpect the ſtate of the hives within certain diſtricts. One perſon, thus employed by a ſociety, might overſee all the hives within two or three counties in one ſeaſon; correcting, as he went along, whatever he found amiſs either in the ſtate or in the management of them, and ſtrictly enjoining, that not a ſingle bee ſhould be killed at any ſeaſon of the year. The increaſe of bee-hives might alſo be rapidly forwarded, if proprietors of ground, upon giving leaſes to their tenants, were to make it an article in their tack, that the tenant ſhould furniſh the proprietor with ſo many pints of honey produced upon his own ground, annually, in proportion to the ſituation and extent of his farm, and for which he ſhould be allowed the higheſt market price. And hints might be occaſionally given in the newſpapers, calling the attention of the public to perform the neceſſary offices about their bees, at the proper ſeaſons of the year; as well as to inform the world when any new diſcovery of their nature, or improvement in their management, happens to be made.

Thus I have laid down a PLAN, in terms plain and intellegible to every capacity, for INCREASING THE NUMBER OF BEE-HIVES IN SCOTLAND; and have ſhowed how HONEY and WAX may be increaſed to a PRODIGIOUS AMOUNT, by a proper exertion upon the part of all who have any favourable ſituations for hives, but eſpecially of gentlemen of property, who muſt be ſuppoſed to have the greateſt variety of ſuch advantages. And I now take farewell of my readers, by aſſuring them, upon the credit of near THIRTY YEARS EXPERIENCE, that the plan I have laid down is no chimæra, or *Will-o'-the-wiſp*, but that, by ſtrictly adhering to the preceding directions, they may depend upon meeting with the utmoſt ſucceſs.

FINIS.

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Any Gentleman, or Lady, who may be deſirous of conſulting or employing the Author of this work, with regard to the Management of Bees, in any reſpect, upon addreſſing a line to him at Mr GRANT'S, *Leith Wynd, Edinburgh, will be duely waited upon.*

The Author embraces this opportunity of returning his beſt thanks to his numerous cuſtomers in general, and to thoſe of this metropolis in particular, for the very liberal encouragement he has repeatedly met with from them as a Honey Dealer; and begs that they will favour him with their orders, as early as poſſible, for the honey of the enſuing ſeaſon, to prevent danger of being diſappointed.

EDINBURGH,
July 18. 1795.

ERRATA.

Page v Line 19th, For *both* read *all three.*
—— 9 —— 7th, For *does* read *do.*
—— 21 —— 21ſt, For *connioſſeurs* read *connoiſſeurs.*
—— 22 —— 18th, For *meant* read *meat.*
—— 22 —— 27th, For *gentlemen* read *gentleman.*
—— 27 —— 26th, For *an article* read *articles.*
—— 29 —— 4th, For *preventative* read *preventive.*
—— 31 —— 21ſt, and 22d, For *ſhe prove a bad one and die*, read *moſt or all of the bees die.*
—— 37 —— 16th, For 80,000, read 320,000.
—— 47 —— 29th, For *counties* read *countries.*
—— 76 —— 7th, For *breed* read *bred.*
—— 120 —— 19th, For *ſome ſore* read *a bloody.*
—— 136 —— 17th, For *her* read *it.*
—— 149 —— 2d, For *lon* read *lion.*
—— —— —— 12th; For XIX read XX.
—— 158 —— 2d, For *no* read *every.*
—— 159 —— 13th, For *as* read *that.*
—— —— —— 21ſt, For *bruſh* read *buſh.*
—— 199 —— 8th, For SWAMMERDANE read SWAMMERDAM.
—— 210 —— 3d, For *lever* read *ſleeve.*
—— 215 —— 2d, For *flower*, read *flour.*
—— —— —— 19th, For *fomented* read *fermented.*